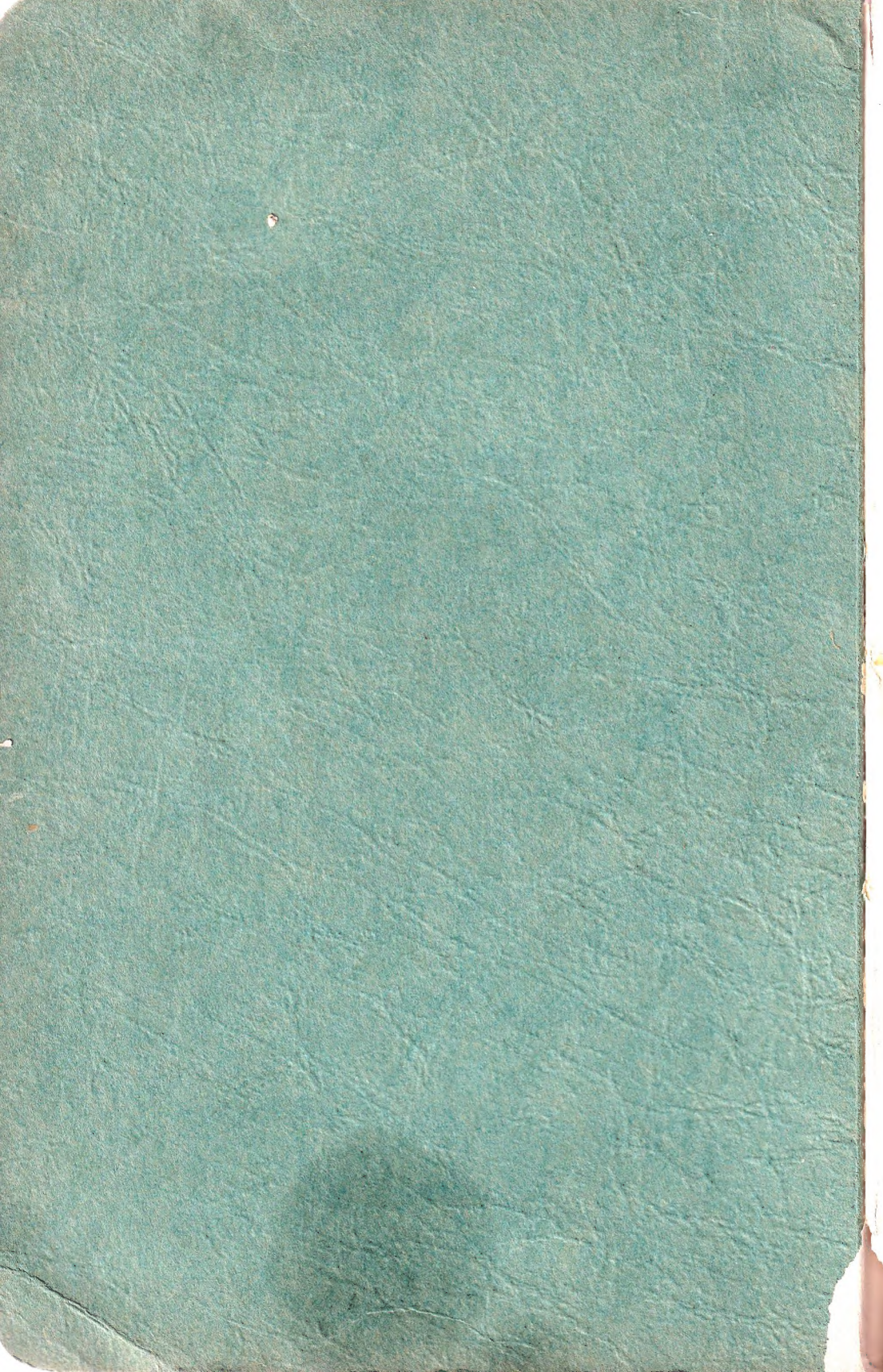


**RADIO OPERATORS'
CODE MANUAL**

WITH TOUCH TYPING

WAYNE MILLER



RADIO OPERATORS' CODE MANUAL WITH TOUCH TYPING

by

WAYNE MILLER

CONSULTING COMMUNICATIONS ENGINEER

(Formerly with Engineering Department Federal Communications Commission)



ZIFF-DAVIS PUBLISHING COMPANY

540 NORTH MICHIGAN AVENUE

CHICAGO 11, ILLINOIS

COPYRIGHT 1943

BY

WAYNE MILLER

Printed in The United States of America

CONTENTS

Subject	Page
Introduction	1
Conquer the code with rhythm (By Mr. Ray Hutchens, Editor of RELAY)	3
Code practice equipment (hand keys, buzzers, audio frequency oscillators)	9
How to construct a hand key	10
How to construct a simple buzzer	12
How to construct a battery powered, low power output vacuum tube oscillator	16
How to construct a light line powered, medium power output vacuum tube oscillator	19
Preliminary sound practice	23
Character group practice	25
Character group practice A-1 (B-G-T-4)	27
Character group practice A-2 (N-H-Y-5-_)	31
Character group practice A-3 (V-F-R-3-\$)	36
Character group practice A-4 (M-J-U-6)	41
Character group practice A-5 (C-D-E-2)	45
Character group practice A-6 (-K-I-7-')	49
Character group practice A-7 (X-S-W-1)	54
Character group practice A-8 (-L-O-8-()-)	58
Character group practice A-9 (Z-A-Q)	63
Character group practice A-10 (/ - ? - : - P - 9)	66
Character group practice(A-11 (-Ø)	72
Key manipulation	75
Preliminary transmitting practice	76
Transmitting practice group B-1	79
Transmitting group practice B-2	84
Transmitting group practice C-1	92
Transmitting group practice C-2	94
Transmitting group practice C-3	96
Transmitting group practice C-4	98
Transmitting group practice C-5	101
Code group practice D (letters)	104
Code group practice E (numerals)	106

Code group practice F (punctuations)	108
Code group practice G (letters, numerals and punctuations)	110
Code practice material, (letters; letters and numerals; letters and punctuations; letters, numerals and punctuations)	113
Introduction to touch typing	121
Instructions for operating the new Super-Speed L. C. Smith (with Navy Telegraphic Keyboard)	124
Touch typing for radio operators.....	139
Base position practice.....	140
Stroking	140
Drills for the index fingers.....	141
Typing practice exercises.....	143
Touch typing copy exercises.....	144
Group copy exercises.....	144
Touch typing practice material.....	144

APPENDIX

Federal Communications Commission Rules and Regulations governing Commercial Radio Operators.....	Page	I
Field Offices of The Federal Communications Commission	Page	IX
Abbreviations to be used in radio communication (Q code)	Page	XI
Miscellaneous abbreviations to be used in Radio Communication	Page	XV
International Morse Code with extracts from the list of punctuations and other signs contained in the Tele- graph Regulations of the Cairo Conference.....	Page	XVII

PREFACE

It has often been said that there is no royal road to learning. Such a statement is especially true when applied to learning the code which is merely another form of language.

The student of code must realize that practice and more practice is the only successful method of learning the code. Slipshod and half-hearted methods are out of place and only straight-forward, systematic and conscientious effort will assure success.

Undertake the study of code with a definite aim in view. Set aside a definite study period and arrange your daily habits to assure your best utilization of the study period. Be systematic, punctual, orderly, and, especially, exacting.

Do not attempt to crowd your mind and body by disorderly thought, impromptu action or hesitancy. Take definite steps, train yourself to take decisive action, and follow through to a successful culmination all your efforts.

Do not be discouraged. Success comes slowly in rapid strides. Forget the disappointments and delays and make provision for their repetition.

Begin your study of code with the one thought uppermost in mind that where others have succeeded you too will succeed. Eliminate all thought of failure and success will crown your efforts.

WAYNE MILLER

Books By

WAYNE MILLER

RADIO OPERATORS' LICENSE MANUAL

RADIO OPERATORS' LICENSE GUIDE
(Now Obsolete)

RADIO OPERATORS' CODE MANUAL,
WITH TOUCH TYPING

(In Process)

RADIO OPERATORS' REGULATION MANUAL

INTRODUCTION

The continental or international morse code is a method of communication utilizing the sound of dits and dahs. The dits are short and the dahs long, to be exact, three times as long. The speed or rapidity of communication is determined by the length of the dit. Combinations of dits and dahs make up letters of the alphabet, digits of the numeral system, and, characters of punctuation. Although the dits and dahs are distinct they are not entirely separate from each other. In combination with pauses or spaces they provide sound characters of distinct identity which must be memorized and practiced until they are instantly recognizable.

Code is used as a medium of exchange for intelligence between two or more minds. The intelligence may be oral, written, or merely an idea to be transmitted from one mind to another with the least possible delay and with the greatest degree of accuracy. The process of converting intelligence into code is termed "sending" whereas the process of converting code into intelligence is termed "receiving." To facilitate the process of exchanging intelligence by means of code the intelligence is broken up into minute portions which are exchanged in proper sequence. The portions may be small, such as letters of the alphabet, or large, such as words of speech. The extent of the portions to be exchanged is determined by the extent of the intelligence under consideration.

Sending and receiving code is the result of combining mental and physical action in a semi-conscious manner. After extensive practice and training the mental and physical processes become one of fixed habit and function without direction. The degree of sub-conscious coordination between mind and body is a direct measure of code transmitting and receiving ability.

Patience, practice and persistence are the fundamental assets towards learning the code. Patience when progress appears slow, practice at all times, and persistence in preventing and eliminating the cause and result of error. To learn the code properly, learn the code exactly. Intelligence which has been communicated in error is of lesser value than the complete lack of intelligence. For this primary reason persist in attaining absolute accuracy, irrespective of speed or habit.

The complete process of code transmission and reception resolves into but two fundamental operations. In transmission the mind converts the intelligence into code and a resultant nervous reaction which directs the body to perform certain functions, in reception the mind converts the code into intelligence and a resultant nervous

reaction which directs the body to perform certain functions. In other words the mind functions with the code and intelligence whereas the body functions with the intelligence and nervous reaction. In a properly trained code specialist the combined mental and physical operations take the form of habit, without conscious direction.

The method of code study embodied in this manual is termed the "sound" method which has been found to be the most practical method of learning code in a short period of time and with a minimum of effort. In this method no thought or study is given to the characters of the code nor the letters, numerals or punctuations for which they stand. The characters are studied as sounds, and they represent certain bodily reactions such as key manipulation in the case of transmission and writing or typing in the case of reception. Practice and study serves to develop a subconscious reaction which automatically coordinates the mind and body in performing the various functions.

The code characters made up of dits and dahs and with the proper pauses or spaces have been broken up into groups which in their entirety contain all the letters of the alphabet, numerals from 1 to 0, and the punctuations set out in chapter IX, Article 35, Section 4 of the International Telegraph Regulations annexed to the International Telecommunications Conference, (Cairo, 1938).

The course of study entails committing the character sounds to memory, practice in converting the character sounds into the bodily action of key manipulation in the case of transmission, and, writing or typing in the case of reception. The groups are arranged in logical sequence and follow through in respective order.

The complete mastery of code is the result of gradually adding to a store of mental and physical habits, properly acquired and in orderly sequence. The acquired habits, together with instantaneous recognition of sound characters and the intelligence symbols for which they stand provides a foundation upon which a thorough knowledge of code communication may be constructed. Follow the text and practice exercises in proper order, never leave one section until it has been completed, refrain from paying attention to succeeding sections; be thorough, exacting, conscientious, attentive to minor details and look upon each section as a new experience and a challenge.

CONQUER THE CODE WITH RHYTHM

By Ray Hutchens

Editor of RELAY, the Journal of R.C.A. Communications, Inc.

(Used with permission of the Author and Publisher)

"It don't mean a thing if it ain't got that swing!" The author stresses the importance of spacing, and describes, for the first time, his original five BSL. If you're trying to learn the code without knowing the keying cycle, it's just two baud.

"The task of all telegraphy is to transfer intelligence in baud lengths. The baud is the shortest interval, at any speed, in any code, during which a signaling sense may be represented. It is the basis of all telegraphic codes.

The chart shows how code characters (the dot, the character space, and the dash) are combined to represent the letters, figures, and punctuation used in radio telegraphy. The letters are formed to show their exact relation to the baud. The space separating letter characters is always one baud long. In the diagram, a three-baud interval separates letters, and a seven-baud interval separates words. Many textbooks represent these lengths incorrectly.

In operation, if signals are not in proper 1-3 ratio, or if spaces are not in the 1-3-7 ratio, something is wrong. If a perforator "jumps" or "joins," there are too many, or too few, baud intervals between letters or words. When an automatic transmitting "head" is adjusted, it is set so that dots and character spaces are equal. By watching the "bias" (the dot-character space relation) of signals, a technician keeps his transmitter close to the ideal keying ratio. If he doesn't, his circuit suffers.

Since the interval is so important, it's good to know the baud!

In most electrical codes, intelligence is transferred by a succession of two conditions: **signal**, or "mark"; and **no signal**, or "space." With a radio transmitter, these two conditions are expressed by alternate periods of **radiation** and **no radiation**; with a blinker, **darkness** and **light**; on the diagram, **black** and **white**.

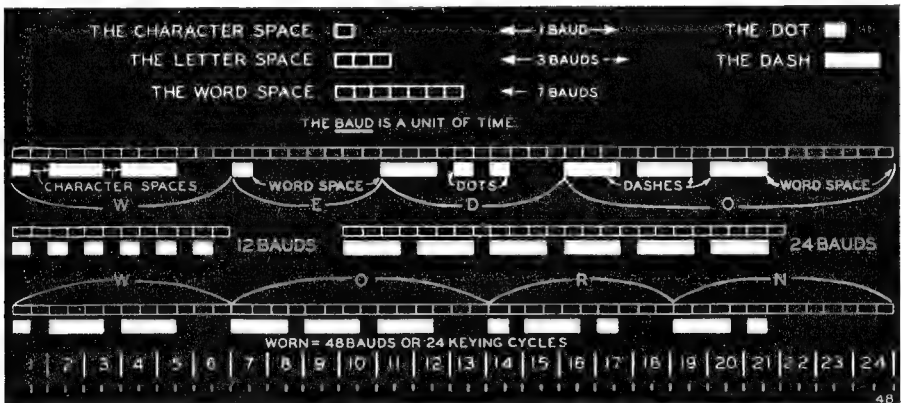
The two conditions need not be absolute. For example, a heliograph utilizes **daylight** and **sunlight**; and while the contrasting conditions are both represented by light, its intensity is varied to distinguish the conditions from each other. **Any** two things which form a contrast might be used for signaling. A person could, by letting a ham sandwich **with mustard** express a difference from one **without**, signal in code, although it would probably take so long he would eat one before the message was finished. In that event, the other would **not exist as a signal**.

A telegraph sounder expresses both conditions by **silence**. Its clicks have no signaling duration; the silence representing the "mark" may be distinguished from those of the other—"space"—condition only by the difference in clicks which precede them. One sound designates a point in time where "mark" begins and "space" ends; the other, the point of transition from "mark" to "space." Either silent

period sounds the same as the other, if it is heard alone; it is not a signal until it is followed by another, a contrasting signal.

It becomes apparent that learning the code entails more than the one condition represented by dots and dashes. They do not represent the necessary two conditions, but are "mark" lengths, differing only in duration. The "space" intervals, **without which dots and dashes do not exist**, are equally important.

Did you ever copy the back-wave of an arc transmitter, which gives a sound, not for dots and dashes, but for the intervening spaces? You can, by hearing the spaces alone, let **sound** represent "space," and **silence**, "mark." In this manner, two signaling conditions are present. Here is a state of affairs where you can copy code **without hearing the dots and dashes**. If the "spaces" are so important, we might as well learn the "spaces" and "marks" together. If you have finished your sandwich, let us look at the diagram.



In **International Morse (radio) Code**, all signaling is accomplished by various successions of five Basic Signaling Lengths. First, the dot, of one unit length. Second, the dash, of three. Third, the character-space, of one unit; no dot or dash is a signal unless it is followed by one. Fourth, the letter-space, of three unit lengths, to which each code letter owes its existence. Fifth, the seven-unit word-space, which, when following a group of letters, carries the significance that a word has been completed.

A typical grouping of these five Basic Signaling Lengths is shown on the diagram, representing in code the words "we do." Notice the part the three "space" lengths play in the combination. Of the 48 time units, 26 are "space"; 22 are "mark."

The word "baud" is a terminological blessing which honors **M.**

Baudot, inventor of the five-unit printer code. It replaces the clumsy near-equivalent "half cycle" and "time unit." The baud is the primary structural interval in telegraphic mechanics, and has a duration—**at any speed**—of one-half a keying cycle. It is basic because it is the shortest possible time in which either keying condition can be represented.

The five **BSL**, being built of these primary units, bear relation to them. On the diagram, this is expressed in bauds; a dot or a character-space is one baud long; a dash or a letter-space, three; and a word-space, seven.

A surprising fact transpires when the **BSL** are arranged in temporal sequence; although a dash is three times as long as a dot, it takes twice as much time to **send** them. The reason is that the dots cannot be sent unless followed by a character-space; neither can dashes. The combination of "mark" and "space" which compose a dot is two bauds long; a dash, four. Similarly, no letter can be used as a signal unless it is followed by a letter-space. The words "we" and "do" must be so designated by a word-space.

The one feature which is common to all the code devices described in this text is **rhythm**; the relation, not only of dot and dash, but the relation between the five Basic Signaling Lengths. When you practice, keep your time relations in mind, **even before you learn the code**. The reason for this will become apparent when you get up to about 10 words per minute—when you pass this point, you will stop counting signal "marks," and think of the code as various rhythmic groups, rather than as quantitative buzzes.

Start, before you memorize the chart, by feeling the mechanical rhythm of dots, character-spaces, and dashes. Send a continuous series of dots at any speed. They will be simply an alternation of "mark" and "space" units of equal length. Then practice dashes—**three** parts "mark," followed by one part "space." After that, memorize the code, add the letter-space and word-space, and practice word groups.

Diagram the alphabet and numerals on graph paper; it will help you to picture the timing and proportion of what you are sending. If the total time units is **odd**, you will have made a mistake in combining the five groups. All letters, numbers, and punctuation require an **even** group of time units. All code groups require a certain number of **keying cycles** (bauds divided by two), and all keying must come out to a prime number of keying cycles.

A "word," in radio code, is the amount of intelligence that can be expressed in 24 keying cycles. The word "worn" happens to require exactly that amount. Words of various code- and letter-lengths

are, of course, mixed in transmission without regard to the **actual** word length, but their average code length has been determined at 24 cycles of keying, or 48 time units. The computation involves an elaborate consideration of word lengths compared with the frequency with which they appear; and of the code lengths of letters, compared with the number of times they are used. Don't bother to check the figures unless you are wrecked alone on a desert island.

If the word "worn" is sent in three seconds, the rate will be 20 words per minute (w.p.m.). The ratio between keying speed (in cycles per second) and w.p.m. is two to five. The rate in c.p.s. then, would be eight. At this keying speed, each dot **cycle** would last an eighth of a second; each two-cycle dash, a quarter second. At ten w.p.m., at a keying speed of four cycles, the dot cycles would be a quarter second long, and the two dash-cycles, a half second. "Worn," this speed, would be sent in exactly six seconds.

The five **BSL** proportions on the diagram, of course, hold good at any keying speed. Estimating your speed by means of **BSL** will give you more accurate results than by the usual "counting of letters per minute and dividing by five." The **BSL** method is based upon the **code** lengths being sent, while the other considers all letters of equal length. With the latter method, to illustrate with an extreme, a count of five-letter groups of **e**'s would indicate a much higher speed than corresponding groups of **o**'s, even when the actual keying speed was the same in both cases. While **e** and **o** are both single letters, **e** requires two cycles; **o**, seven. So estimate your code speed by the actual **BSL** total; when you are tested, it will be with automatic equipment which is calibrated in keying-cycle rate, not letter-rate.

The application of these rhythmic fundamentals will be valuable in terms of circuit operation. A good fist, aside from its beautiful sound, has another intrinsic worth. As one of the most important factors in signaling is the optimum contrast between the two carrier conditions, good sending—to take advantage of the available contrast—is fully as important as good equipment. Under adverse conditions of static and fading, **the maximum speed and distance is possible only when the proper BSL proportions are kept.** For instance, if the sending is "chirpy," or light, the dot "mark" does not occupy as much of the dot-cycle as it should, and hence contrast between the two conditions is lost. If sending is "heavy," the dot "mark" equals more than half the keying cycle. The best efficiency between transmitter and receiver is maintained by dividing the cycle into equal parts of "mark" and "space"; any divergence from this proportion results in either a lower speed or a reduced range. A good fist, then, is as important as new tubes or increased power. Cultivate the ideal sending proportions and put your money into War Bonds.

INTERNATIONAL MORSE CODE

Showing the relation of each character to the baud

BAUDS—1 2 3 4 5 6 7 8 9										13	BAUDS—1 2 3 4 5										10	15	19		
A	[Pattern]											0	[Pattern]												
B	[Pattern]											1	[Pattern]												
C	[Pattern]											2	[Pattern]												
D	[Pattern]											3	[Pattern]												
E	[Pattern]											4	[Pattern]												
F	[Pattern]											5	[Pattern]												
G	[Pattern]											6	[Pattern]												
H	[Pattern]											7	[Pattern]												
I	[Pattern]											8	[Pattern]												
J	[Pattern]											9	[Pattern]												
K	[Pattern]											.	[Pattern]												
L	[Pattern]											:	[Pattern]												
M	[Pattern]											;	[Pattern]												
N	[Pattern]											,	[Pattern]												
O	[Pattern]											?	[Pattern]												
P	[Pattern]											'	[Pattern]												
Q	[Pattern]											-	[Pattern]												
R	[Pattern]											(	[Pattern]												
S	[Pattern]											/	[Pattern]												
T	[Pattern]											'	[Pattern]												
U	[Pattern]											Break Signal													
V	[Pattern]											[Pattern]													
W	[Pattern]											Mixed Group													
X	[Pattern]											Underline													
Y	[Pattern]											[Pattern]													
Z	[Pattern]											End of Message													

You will work much harder raising your speed from 0 to 10 w.p.m. than from 10 to 50. Once you pass 10, you **feel** the code, sensing its sequence and proportion rather than analyzing each letter as a number of signals. Perhaps the best system is the one suggested by a professional friend: "Make your ears positive, your hands negative, and short-circuit your brain."

It is a good idea to "short-circuit your brain" when you listen to music—it is while you are in this condition that you get the greatest emotional wallop. It's the best way to listen to code, too; for code has varying pitch, changing volume, and a basic rhythm. A good brass-pounder puts music on the air.

CODE-PRACTICE EQUIPMENT

In order to successfully master the code some type of code-practice equipment is necessary. Such equipment may consist of simple key and buzzer sets, audio frequency oscillators, tone-wheel audio frequency signal generators, or more elaborate installations of tape transmitting and recording apparatus, electrical code speed counters, and group instruction tables.

Code practice equipment is available from the majority of radio and electrical supply dealers at reasonable cost, or, if desired, the equipment may be constructed from parts available. The study of code is closely related to the study of electrical theory and therefore personal construction of the equipment may contribute valuable knowledge of the operation of circuits and component parts.

This chapter is devoted to the construction and operation of code-practice equipment, ranging from simple to more elaborate types. Directions are given for the assembly, wiring, and operation of the equipment together with lists of the component parts and the approximate cost. The equipment described and illustrated is available in "Assembly Kits" at nominal prices.

HAND KEYS

The first essential item of code-practice equipment is the hand key, a typical manufactured model illustrated in Figure 1 and a home-made model illustrated in Figures 2 and 3.

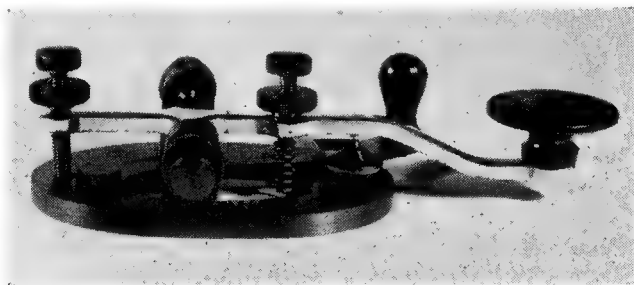


Figure 1

The hand key is used to make and break an electrical circuit in accordance with telegraphic code. When the key lever is pressed the circuit is closed and when the pressure is released a spring causes the lever to return to its original position thereby opening the circuit. The supporting member of the key is called the base, the movable arm is called the lever. The contacts are called the base contact and lever

contact respectively. Some models of keys are fitted with "shorting-arms" which act to close the keyed circuit without the necessity for keeping the lever in the depressed position. Such keys are used mainly in wire telegraphy and are seldom used in radio telegraphy. Hand keys range in price from one to several dollars.

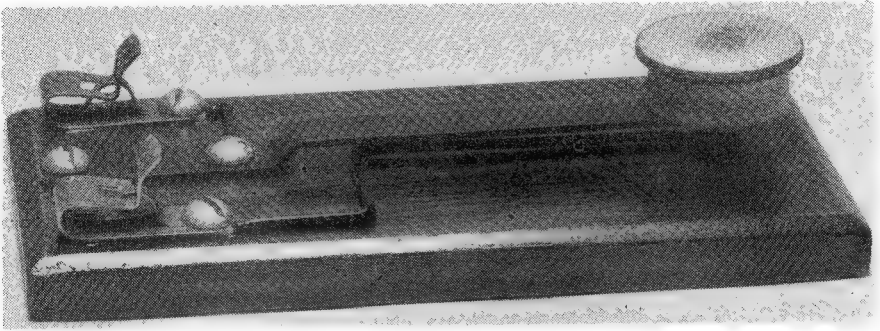


Figure 2

The home-made key illustrated in Figures 2 and 3 may be easily constructed from parts available in the average home or workshop and will adequately fulfill the requirements for a key to be used exclusively for code-practice. The first requirement is a base which may be of birch, maple, oak or some other semi-hard wood. It is cut to size as indicated and given a light coat of shellac or varnish. The lever is a piece of steel or brass strip bent and formed to the dimensions shown. Three holes are drilled in the lever for mounting the lever to the base and the knob to the lever. The knob may be either a short section of an ordinary sewing-thread spool or a wooden washer approximately 1" in diameter. It is fastened to the lever by a No. 6 round head wood screw $\frac{3}{8}$ " long. Two terminals are required to connect the key to an external circuit. Fahnestock clips are used as terminals in the key illustrated. The clips are fastened to the base by No. 6 round head wood screws $\frac{3}{8}$ " long. The clips may be purchased or they may be obtained from discarded dry batteries which have outlived their usefulness. The base contact is a No. 6 round head wood screw $\frac{3}{8}$ " long. It is screwed into the base with the head directly below the screw which holds the knob to the lever. Copper wires are connected between the left terminal and the base contact and between the right terminal and the lever. After the key has been assembled the spacing between the lever contact and the base contact should be adjusted to approximately $\frac{1}{16}$ " by bending the lever with a heavy pair of pliers.

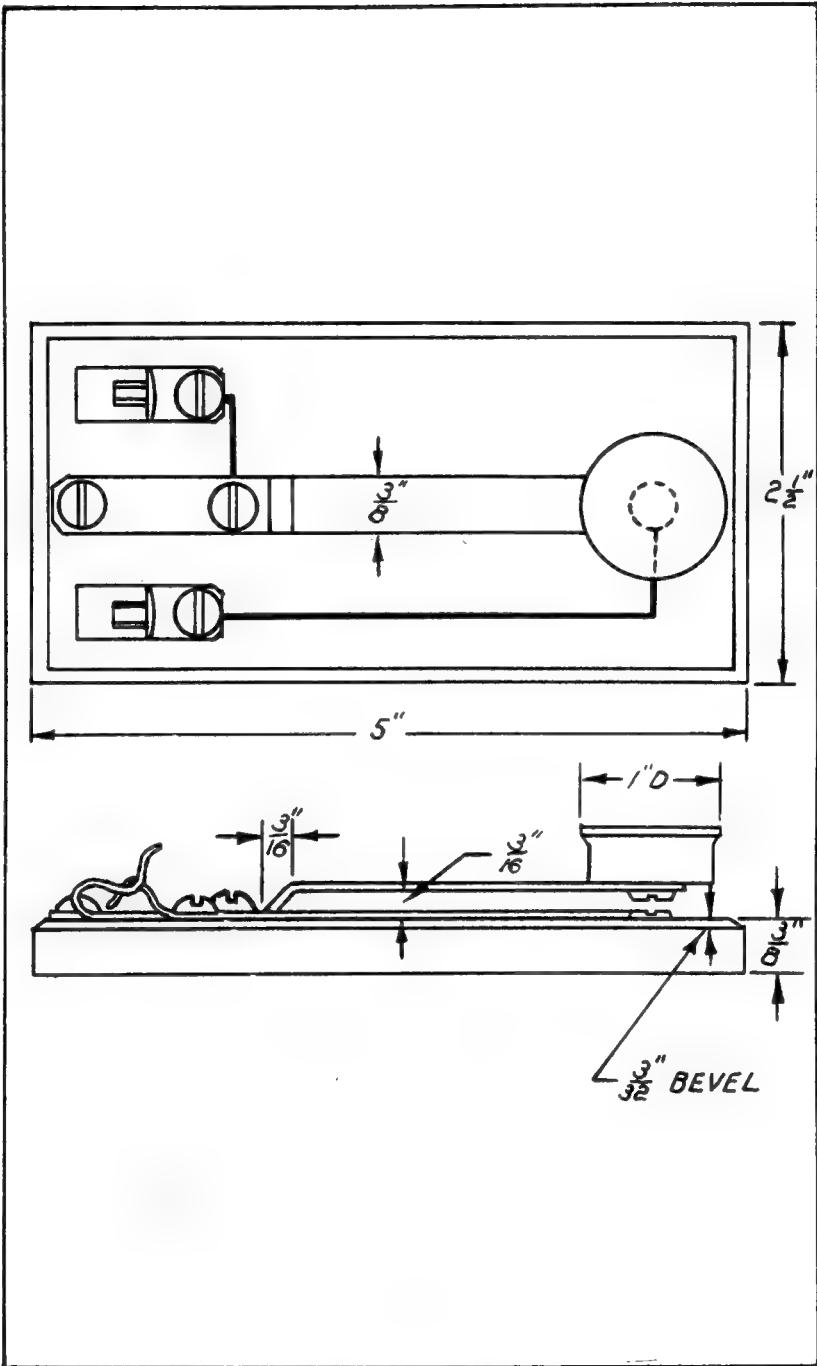


Figure 3

BUZZERS

Buzzers are used in code-practice equipment as audible-signal generators actuated by electrical impulses. Two types of buzzers are illustrated in Figures 4, 5, and 6. Buzzers are electro-magnetic devices and operate on direct current. They consist of an electromagnet, an armature together with an armature contact and a stationary contact. When an electromotive force is applied to the electromagnet it becomes energized and attracts the armature thus pulling the armature contact and stationary contact apart which breaks the circuit. When the circuit is broken the electromagnet is no longer energized thereby permitting the armature to spring back to its original position bringing the contacts together which completes the circuit and the operation continues. The frequency of operation and consequently the tone is determined by the stiffness of the armature spring, the spacing between the armature and the electromagnet, and the spacing between the contacts. The buzzer illustrated in Figure 4 is a high-frequency buzzer developed primarily for code-practice use. Buzzers range in price from fifty cents to several dollars.

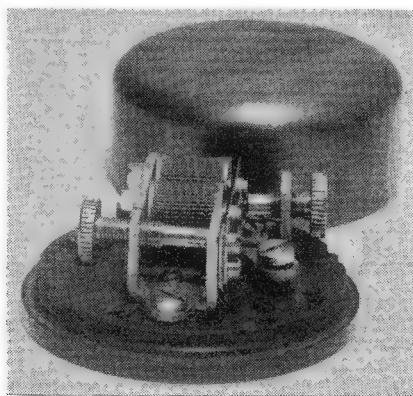


Figure 4

The home-made buzzer illustrated in Figures 5 and 6 may be easily constructed from parts available in the average home or workshop and will adequately fulfill the requirements for a buzzer to be used exclusively for code-practice. The first requirement is a base which may be birch, maple, oak or some other semi-hard wood. It is cut to size as indicated and given a light coat of shellac or varnish. The electromagnet consists of a $\frac{1}{4}$ " stove bolt $1\frac{1}{2}$ " long, two cardboard washers, two stove bolt nuts and about 1 ounce of No. 32 double cotton covered magnet wire. The cardboard washers are

slipped onto the stove bolt and the space between the washers covered with a layer of ordinary household string. Enough of the bolt must remain uncovered to permit its being fastened to the base by the stove bolt nut. After the bolt has been covered with string the space between the washers is wound full of wire in even layers, one upon the other. The ends of the wire are extended about 3" to provide connections between the electromagnet and the external circuit. The

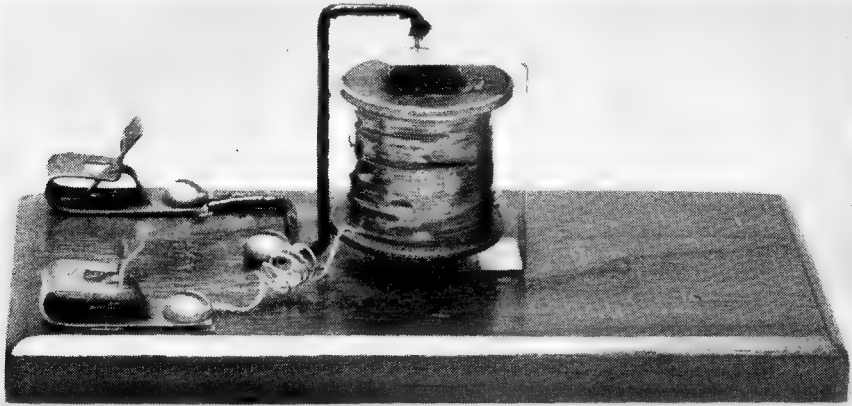


Figure 5

electromagnet is mounted upon the base in a central position and fastened tightly. The armature is a piece of tin or light iron strip bent and formed as shown. It is drilled or punched on one end to fit the $\frac{1}{4}$ " stove bolt which fastens it to the base. Mount the armature so that the upper fold is approximately $\frac{1}{32}$ " above the top of the electromagnet. The stationary contact is a piece of heavy brass or copper wire bent and formed as shown. It is mounted on the base with a No. 6 round head wood screw $\frac{3}{8}$ " long in such a position that the tip of the wire lightly touches the armature, thereby providing an electrical contact. Two terminals are required to connect the buzzer to an external circuit. Fahnestock clips are used as terminals in the buzzer illustrated. The clips are fastened to the base by No. 6 round head wood screws $\frac{3}{8}$ " long. After the buzzer has been assembled it should be connected as shown with the inside wire of the electromagnet connected to the armature, the outside wire of the electromagnet connected to the left hand base terminal and a copper wire connected between the stationary contact and the right hand base terminal. The buzzer may be tested by connecting a dry battery to

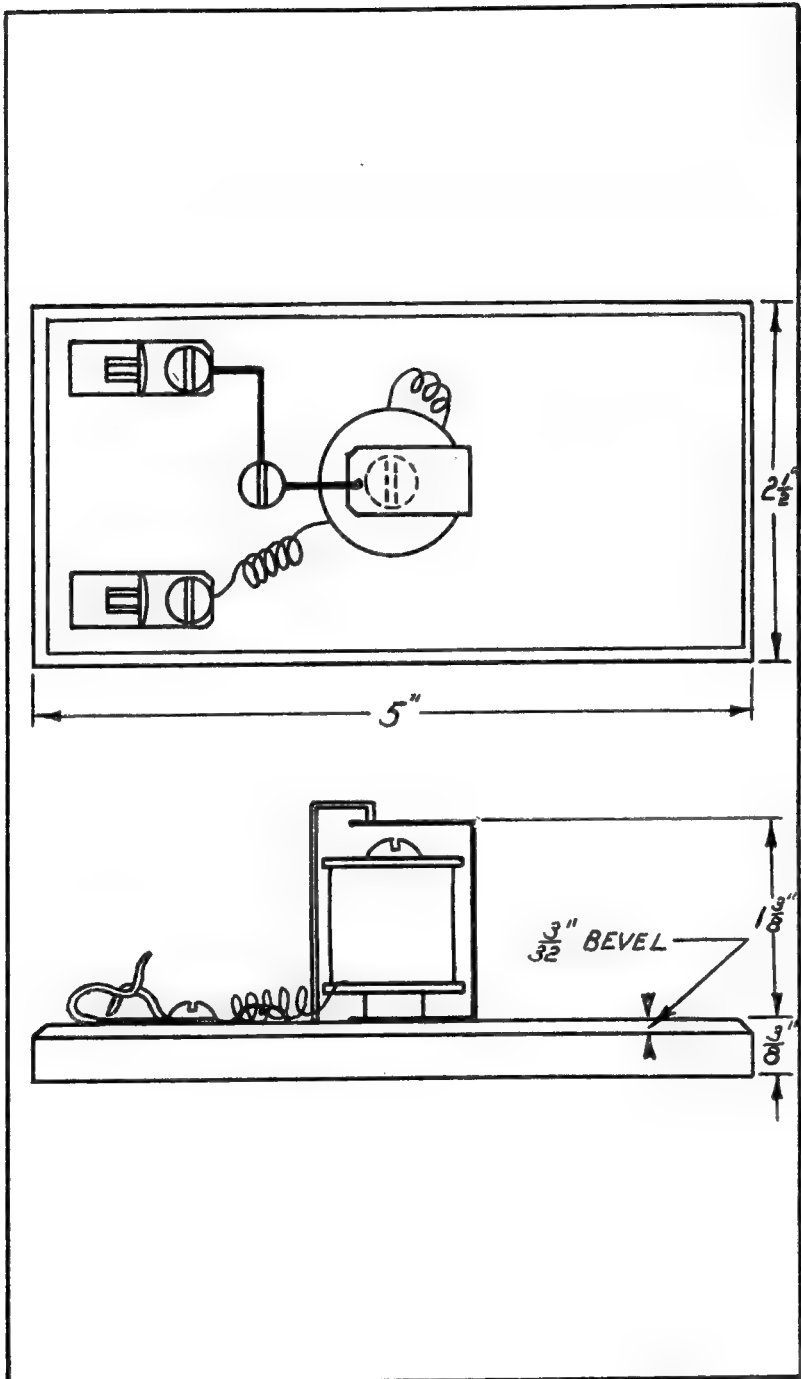


Figure 6

the terminals, and, the armature and stationary contact bent to alter the spacing until the buzzer operates properly.

AUDIO FREQUENCY OSCILLATORS

Audio frequency oscillators are used in code-practice equipment as audio-signal generators actuated by vacuum tubes. Although the fundamental principle of operation of the various types of audio frequency oscillators is similar they may differ in components and construction details. For this reason two types will be described and illustrated thereby permitting a selection to be made of the type best suited to a particular requirement. The requirement may vary as to source of power, availability of component parts, the amount of power output required, and, primarily, the cost of construction.

Vacuum tube audio oscillators require the following components, for the purposes indicated; 1—One or more vacuum tubes to convert the applied input power to audio frequency energy; 2—A source of either direct or alternating current power to actuate the vacuum tube/s; 3—A key or other signaling device to break up the applied input power into code signals; 4—An electro-acoustical device, either head telephones or a loudspeaker to convert the audio frequency energy into sound waves; 5—A coupling device to enable the vacuum tube/s to oscillate at audio frequencies.

Vacuum tube audio frequency oscillators depend upon inter-electrode coupling between the tube input and output circuits for their proper function. The inter-electrode coupling may be either inductive (inductors) or capacitive (condensers). Inductive coupling is generally preferred because of the ease of adjustment and availability of component parts.

If a vacuum tube, supplied with proper potentials, is connected in such a manner that a portion of the output energy is introduced into the input circuit in proper phase a condition will arise wherein the tube is caused to oscillate at a frequency determined by the electrical constants (tuning) of the tube circuits. The tuning is primarily determined by the value of inductance and capacitance associated with the circuits. If the value of inductance and capacitance is so proportioned that the tuned or resonant frequency of the tube circuits fall within the audio frequency spectrum (approximately 16 to 16,000 cycles per second), audio frequency energy will be present in the output circuit which may be utilized as a driving source for electro-acoustical devices. A vacuum tube, operating under such conditions is termed a vacuum tube audio frequency oscillator or generator.

A BATTERY-POWERED, LOW POWER OUTPUT VACUUM TUBE OSCILLATOR

The following parts which should be obtainable at a cost of not over \$2.00 are required for the construction of this oscillator: An audio frequency transformer, a triode vacuum tube, a 4 prong vacuum tube socket, a 30 ohm rheostat, six Fahnestock clips, several round head wood screws and a suitable base.

The oscillator, illustrated in Figures 7 and 8 is probably the simplest type of battery powered vacuum tube audio frequency oscillator. It is economical in cost and operation and will furnish ample power for not more than two pair of head telephones. The components required are relatively inexpensive and the assembly requires a minimum of time and effort. The first requirement is the base which may be of birch, maple, oak or some other semi-hard wood. It is cut to size as indicated and given a light coat of shellac or varnish. The four prong vacuum tube socket and the audio frequency transformer are mounted on the base in a central position and the Fahnestock clips mounted along one edge. The rheostat is mounted so that the control knob extends towards the front of the base in a convenient position. The various components are held in place by the round head wood screws which should be tightened up snugly.

It will be noted that the socket has four terminals lettered as follows; "P" for plate terminal, "G" for grid terminal, "—" for negative filament terminal, and, "+" for positive filament terminal. The audio frequency transformer has four terminals lettered as follows; "P" for plate terminal, "G" for grid terminal, "F" for filament terminal, and, "B" for plate supply terminal. The transformer coil connected between the "P" and "B" terminals is the primary winding and the transformer coil connected between the "G" and "F" terminals is the secondary winding. It is not necessary to know the exact terminals of the transformer windings if the individual terminals of the primary and secondary windings are known. To determine which of the four terminals are common to each other it is only necessary to test the transformer by a continuity (closed series circuit) tester and mark the leads. As a convenience in wiring the Fahnestock clips should be numbered from 1 to 6 starting from right to left.

To wire the oscillator proceed as follows: 1—Connect base terminal "1" to socket terminal "—"; 2—Connect base terminal "2" to one terminal of the 30 ohm rheostat; 3—Connect the remaining terminal of the 30 ohm rheostat to socket terminal "+"; 4—Connect base terminal "2" to base terminal "3"; 5—Connect base terminal

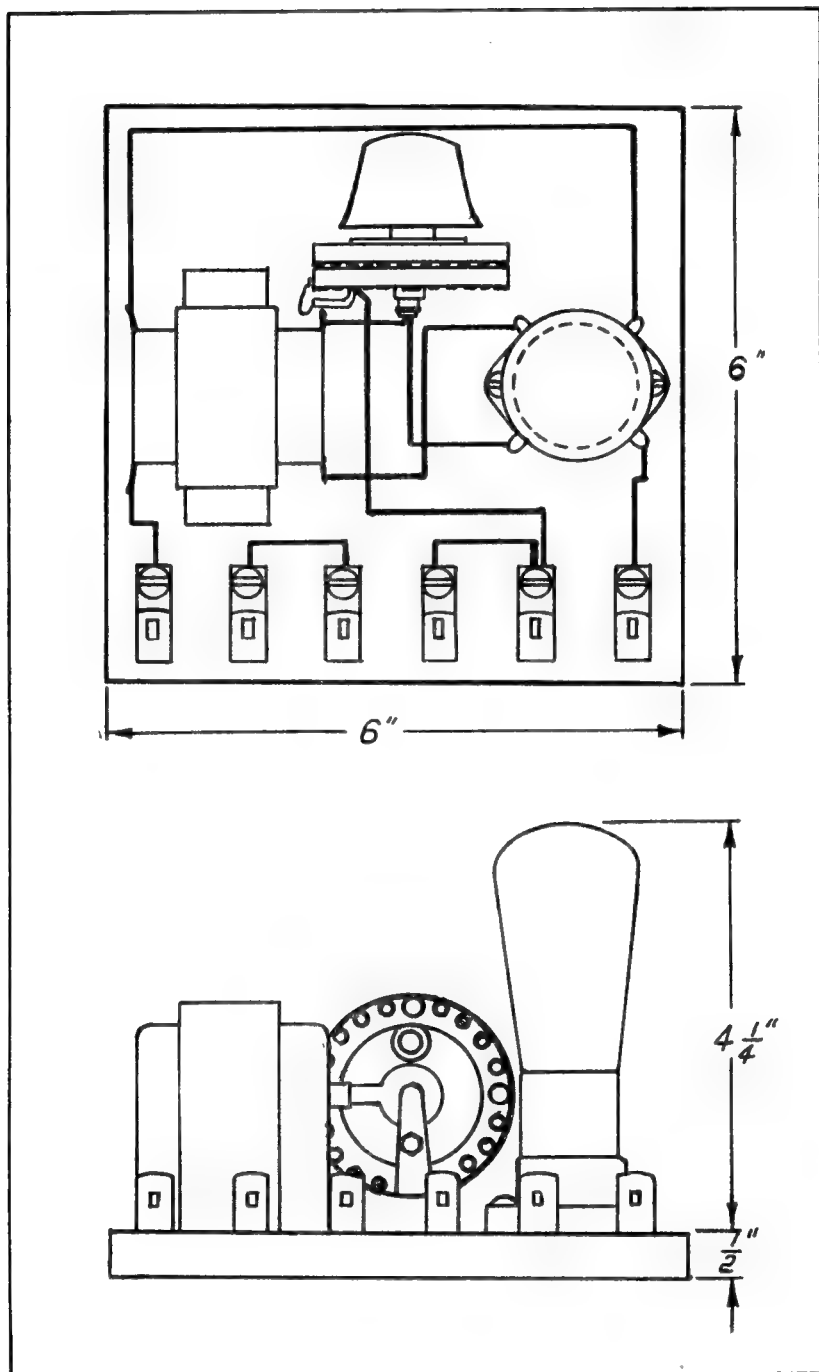


Figure 7

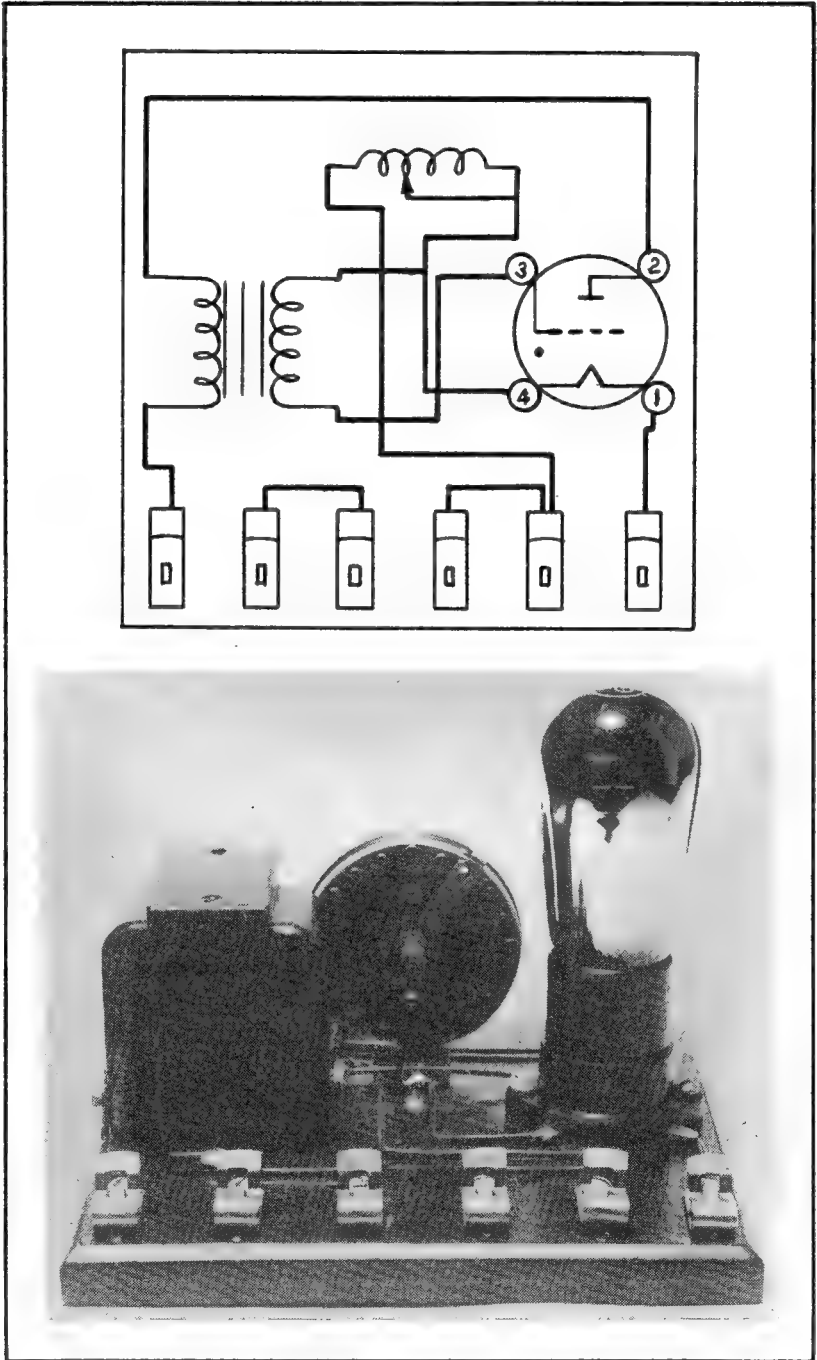


Figure 8

"4" to base terminal "5"; 6—Connect base terminal "6" to transformer terminal "P"; 7—Connect socket terminal "G" to transformer terminal "G"; 8—Connect socket terminal "P" to transformer terminal "B"; 9—Connect transformer terminal "F" to socket terminal "+".

After assembling and wiring the oscillator it is ready for operation. To test the oscillator connect the negative "—" terminal of a battery of proper voltage (a battery may consist of one or more cells), to base terminal "1"; connect the positive "+" terminal of the same battery to base terminal "2"; connect the key or other signaling device to base terminals "3" and "4" and, connect a pair of head telephones to base terminals "5" and "6". When the key is depressed a high pitched whistle should be heard in the head telephones. If the oscillator fails to operate it may be necessary to reverse the transformer terminals leading to the "—" and "G" socket terminals. The tone or pitch of the oscillator may be varied by connecting a small mica condenser across the transformer "F" and "G" terminals. Several sizes may be tried, ranging in value between .001 and .03 microfarads until a satisfactory result is achieved. Various types of triode vacuum tubes may be used with the oscillator depending upon the battery available.

A LIGHT LINE POWERED, MEDIUM POWER OUTPUT VACUUM TUBE OSCILLATOR

The following parts which should be obtainable at a cost of not over \$5.00 are required for the construction of this oscillator: An audio frequency transformer, A type 117N7 vacuum tube, An octal base tube socket, An .01 microfarad, 250 volt fixed condenser, A 3 megohm, $\frac{1}{2}$ watt fixed resistor, A 2,000 ohm, 3 watt fixed resistor, two 10 microfarad, 250 volt filter condensers, Six Fahnestock clips, several round head wood screws and a suitable base.

The oscillator, illustrated in Figures 9 and 10 is a comparatively simple type of light line powered vacuum tube oscillator capable of delivering medium power output. It has ample power delivering capability to operate not over six pair of head telephones or two small loudspeakers. The oscillator utilizes a dual purpose vacuum tube consisting of two sections, a diode (2 element) section used as a rectifier and a pentode (5 element) section used as an oscillator. This type of vacuum tube uses an octal or 8-pin socket whereas the oscillator previously described used a 4-pin socket. The socket terminals are numbered from 1 to 8 starting with the terminal to the left of the base guide pin and running counter-clockwise around the socket when viewed from the top. The number designation of tube base terminals greatly facilitates wiring instructions.

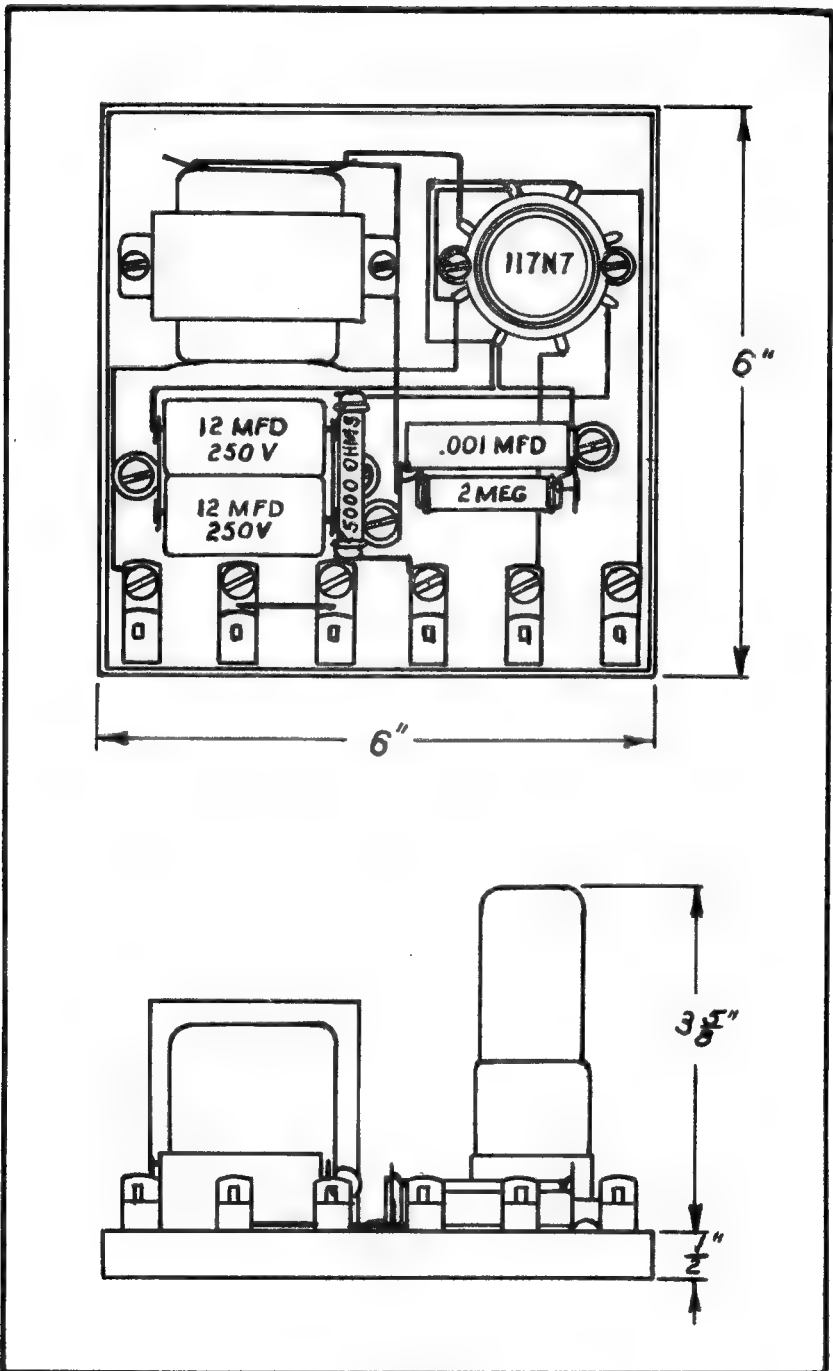


Figure 9

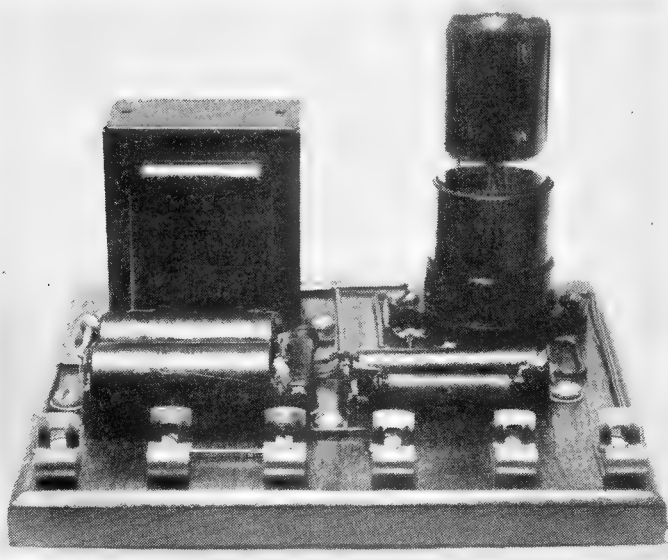
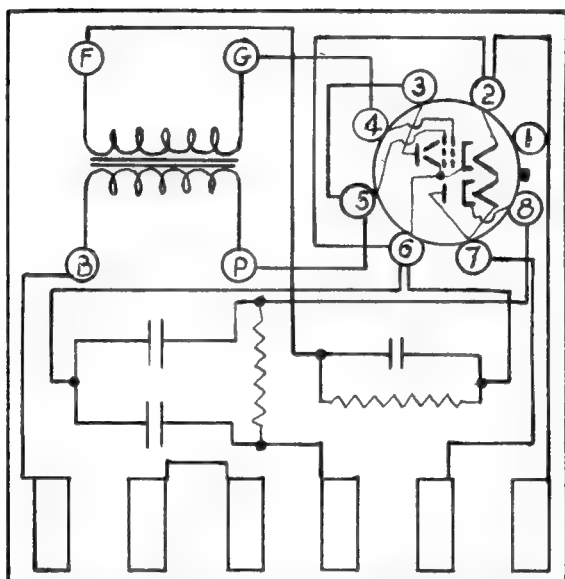


Figure 10

The oscillator components should be mounted and wired as illustrated in Figures 9 and 10 taking care to insure good electrical contact between the various items. To facilitate wiring instructions the base terminals should be numbered from 1 to 6 running from right to left.

To wire the oscillator proceed as follows: 1—Connect base terminal "1" to socket terminal "2". 2—Connect base terminal "2" to socket terminal "7". 3—Connect base terminal "3" to the positive "+" terminal of one of the 12 microfarad 250 volt filter condensers and one terminal of the 2,000 ohm 3 watt fixed resistor. 4—Connect base terminal "4" to base terminal "5". 5—Connect base terminal "6" to transformer terminal "B". 6—Connect socket terminal "2" to socket terminal "6". 7—Connect socket terminal "3" to socket terminal "5". 8—Connect socket terminal "4" to transformer terminal "G". 9—Connect socket terminal "5" to transformer terminal "P". 10—Connect socket terminal "6" to the negative "—" terminals of both 12 microfarad 250 volt filter condensers and to one terminal of the 3 megohm fixed resistor and the .01 microfarad fixed condenser. 11—Connect socket terminal "8" to the positive "+" terminal of the remaining 12 microfarad 250 volt filter condenser and the remaining terminal of the 2,000 ohm 3 watt fixed resistor. 12—Connect transformer terminal "F" to the remaining terminal of the 3 megohm fixed resistor and the remaining terminal of the .01 microfarad fixed condenser.

After assembling and wiring the oscillator it is ready for operation. To test the oscillator connect a light-line cord and plug to base terminals "1" and "2"; connect the key or other signaling device to base terminals "3" and "4"; and, connect the head telephones or loudspeakers to base terminals "5" and "6". When the key is depressed a high pitched whistle should be heard in the head telephones or loudspeaker. If the oscillator fails to operate it may be necessary to reverse the transformer terminals connected to base terminal "6" and socket terminal "5". If the oscillator is used on a D.C. (direct current) line it may be necessary to reverse the line cord in its socket in order for the oscillator to function properly. The tone of the oscillator may be varied by substituting various values of fixed resistors for the 3 megohm value specified. Values of resistance ranging from 50,000 ohms to 5 megohms will prove satisfactory. Caution should be exercised in the use and operation of this oscillator since it is capable of delivering a severe shock.

PRELIMINARY SOUND PRACTICE

This section is devoted to the study and committing to memory the sound characters composed of dits and dahs either singularly or in combination with other characters. In certain instances the combinations of dits and dahs have definite meanings while in others the combinations are meaningless. Pay no attention to the meaning or lack of meaning of the combinations, merely practice the sounds.

Repeat to yourself the following sounds, accenting the I of dit and the A of dah. The dit should sound as "it" preceded by a lightly accented D and the dah should sound as "ah" preceded by a lightly accented D.

(1) Repeat each line five times before proceeding to the following line.

DITDITDITDITDITDITDITDITDIT
 DAHDAHDAHDAHDAHDAHDAHDAH
 DITDITDAH DITDITDAH DITDITDAH
 DITDITDITDAH DITDITDITDAH
 DITDITDITDITDAH DITDITDITDAH
 DITDITDAHDAH DITDITDAHDAH
 DITDAH DITDITDAHDAH DITDAH DITDAH
 DITDAHDAHDAH DITDITDAHDAH DIT
 DITDITDAH DITDITDITDAH DITDIT
 DITDAH DITDAH DITDITDAH DITDAH DIT
 DITDAH DITDAH DITDAH DITDAH DITDAH
 DAHDITDAH DITDAH DITDAH DITDAH DIT
 DAHDAH DITDAHDAH DITDAHDAH DIT
 DAHDAH DITDITDAHDAH DITDIT
 DAHDITDAHDAH DITDITDAH DITDAH DIT
 DAHDITDITDITDAHDAH DITDITDITDAH
 DAHDAH DITDAHDAHDAH DITDAHDAH
 DAHDITDAH DITDAHDAH DITDAH DITDAH

- (2) Repeat each line ten times before proceeding to the following line.

DITDAHDITDAH

DAHDAHDITDAHDAH

DITDAHDITDAH

DAHDAHDAHDI

DAHDAHDAHDAH

DAHDAHDAHDI

DAHDAHDITDAHDAH

DITDITDAHDITDIT

DITDITDAHDITDIT

DITDITDAHDAH

DAHDAHDAHDAH

DITDITDAHDAH

- (3) Obtain the assistance of a second person to read each line of the above exercises to you aloud while speaking with a clear and distinct tone of voice. Concentrate on the difference of sound combinations while the speaking is taking place.
- (4) Read each line of the above exercises aloud to a second person, asking them to particularly note any deflection or inflection of your voice.

CHARACTER GROUP PRACTICE

In the study of code, the alphabet, numerals and marks of punctuation are broken up into groups to facilitate progressive study. The order of the particular groups or the order of the individual characters within the groups have no definite meaning, however, the sequence should be followed to prevent repetition or over-emphasis of any one particular group or character. It will be noted that a chart showing the proper method of printing the individual character is shown at the heading of each study group. This order in printing should be followed implicitly, even though it means developing a new method or discarding older methods. The light lines adjacent to the characters indicates the direction of pencil movement and the numerals adjacent to the light lines indicates the order of the pencil movement. If the character requires more than one movement of the pencil the number 1 movement should be completed first, followed by the required number of movements necessary to complete the character as indicated.

A touch typing chart of the Navy Telegraphic Keyboard is shown at the heading of each study group. The chart has the group characters and their relative position on the keyboard indicated whereas the other keys have been purposely left blank. The position of the keys should be memorized at the time the group is being memorized thereby providing a firm foundation upon which to construct high speed code typing.

The study of a particular group should be undertaken with three distinct objects in mind, to memorize the sound of the characters, to learn to print them properly and with the least effort, and, to learn their relative position on the typewriter keyboard.

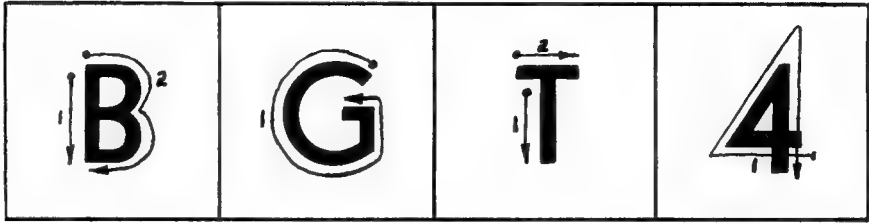
The alphabet, numerals, and marks of punctuation as stipulated in the International Telecommunications Conference have been broken up into eleven distinct study groups. The characters in the particular groups vary in accordance with their relative position on the Navy Telegraphic Keyboard and in some instances entail considerable study. In addition, the characters which are used the most frequently are given the least amount of study and practice therefore the time required to complete the various groups will vary considerably. To avoid confusion the study of but one group should be undertaken at a time, and the study continued until the three functions of the particular group are thoroughly memorized and semi-automatic in accomplishment. Frequent review should be undertaken, in a systematic and orderly manner thereby preventing over-emphasis of any particular group of characters.

There appears to be no definite grounds for the ancient belief

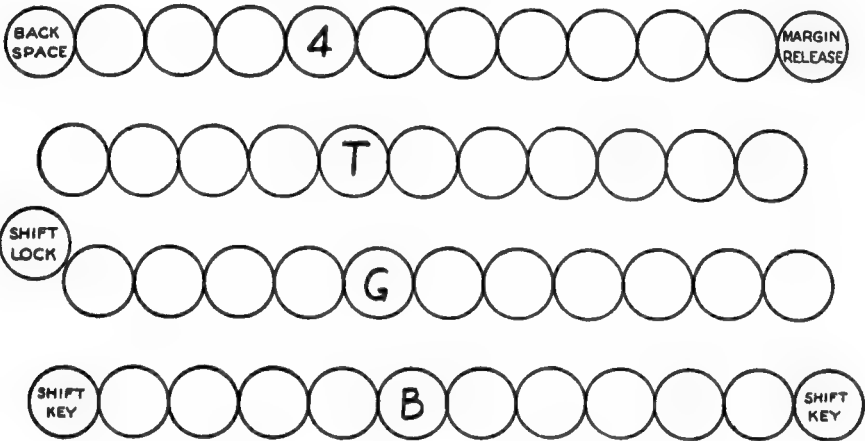
that any one particular character or group of characters is harder to memorize than any other character or group of characters. This theory has been proven false in innumerable instances and the fundamental concept arises that a person either does or does not know the code. There is no mid-point in either the degree or progress nor the development of speed, and, systematic, orderly study and practice will develop an ordinary mind and body to a point where copying code is a semi-conscious effort.

The assistance of a second person is of immeasurable value in learning the code, however, if such outside assistance is not available the same results may be attained with but a slightly greater expenditure of effort. Tape machines are of inestimable value and every effort should be made to either borrow or buy one if at all possible. Tapes which may be adapted to the majority of tape machines are available punched to follow the particular sequence of this volume and have proven highly effective in developing maximum code and typing speed in a minimum of time.

CHARACTER GROUP PRACTICE A-1



Method of printing characters.



Keyboard position of characters.

- (1) Repeat three times, slowly and distinctly, the following character sounds:

DAHDITDITDIT DAHDITDITDIT DAHDITDITDIT
 DAHDITDITDIT DAHDITDITDIT DAHDAHDI DAHDAHDI
 DAHDAHDI DAHDAHDI DAHDAHDI DAH DAH DAH DAH
 DAH DITDITDITDITDAH DITDITDITDITDAH
 DITDITDITDITDAH DITDITDITDITDAH DITDITDITDITDAH
 DAHDITDITDIT DAHDITDITDIT DAHDAHDI DAHDAHDI
 DAH DAH DITDITDITDITDAH DITDITDITDITDAH
 DAHDITDITDIT DAHDAHDI DAH DITDITDITDITDAH
 DAHDITDITDIT DAHDAHDI DAH DITDITDITDITDAH

- (2) Print five lines of the letter “B” while repeating slowly and distinctly the character sound DAHDITDITDIT:

BB
 BB
 BB
 BB
 BB

- (3) Print five lines of the letter “G” while repeating slowly and distinctly the character sound DAHDAH DIT:

GG
 GG
 GG
 GG
 GG

- (4) Print five lines of the letter “T” while repeating slowly and distinctly the character sound DAH:

TTT
 TT
 TT
 TT
 TT

- (5) Print five lines of the numeral “4” while repeating slowly and distinctly the character sound DITDITDITDITDAH:

444
 44
 44
 44
 44

- (6) Study the keyboard of the group characters and memorize their relative position. Note that the characters are typed with the first finger of the left hand and that no shifting of the typewriter carriage is necessary for this particular group.

- (7) Place your right hand flat upon the table top and smartly tap the first finger of your left hand upon the table while slowly and distinctly repeating the following exercise:

DITDITDITDITDAH DITDITDITDITDAH DITDITDITDITDAH
 DITDITDITDITDAH DITDITDITDITDAH DAH DAH DAH DAH
 DAH DAHDAHDI DAHDAHDI DAHDAHDI DAHDAHDI
 DAHDAHDI DAHDITDITDI DAHDITDITDI
 DAHDITDITDI DAHDITDITDI DAHDITDITDI
 DITDITDITDITDAH DITDITDITDITDAH DAH DAH
 DAHDAHDI DAHDAHDI DAHDITDITDI DAHDITDITDI
 DITDITDITDITDAH DAH DAHDAHDI DAHDITDITDI
 DITDITDITDITDAH DAH DAHDAHDI DAHDITDITDI

- (8) Place your right hand flat upon the table top and smartly tap the first finger of your left hand upon the table while slowly and distinctly repeating the character sounds of the following exercise:

B G T 4	B G T 4	B G T 4	B G T 4	B G T 4
G T 4 B	G T 4 B	G T 4 B	G T 4 B	G T 4 B
T 4 B G	T 4 B G	T 4 B G	T 4 B G	T 4 B G
4 B G T	4 B G T	4 B G T	4 B G T	4 B G T

- (9) Repeat slowly and distinctly the following character sounds while printing the characters for which they stand. Do not crowd the printing, make the characters small, neat and legible, concentrate upon the character sound and the direction and order of pencil movement:

DAHDIITDIIT DAHDAHDI DAH DIITDIITDIITDAH
 DAHDAHDI DAH DIITDIITDIITDAH DAHDITDIITDI
 DAH DIITDIITDIITDAH DAHDITDIITDI DAHDAHDI
 DIITDIITDIITDAH DAHDITDIITDI DAHDAHDI DAH
 DAHDITDIITDI DAHDAHDI DAH DIITDIITDIITDAH
 DAHDAHDI DAH DIITDIITDIITDAH DAHDITDIITDI
 DAH DIITDIITDIITDAH DAHDITDIITDI DAHDAHDI
 DIITDIITDIITDAH DAHDITDIITDI DAHDAHDI DAH

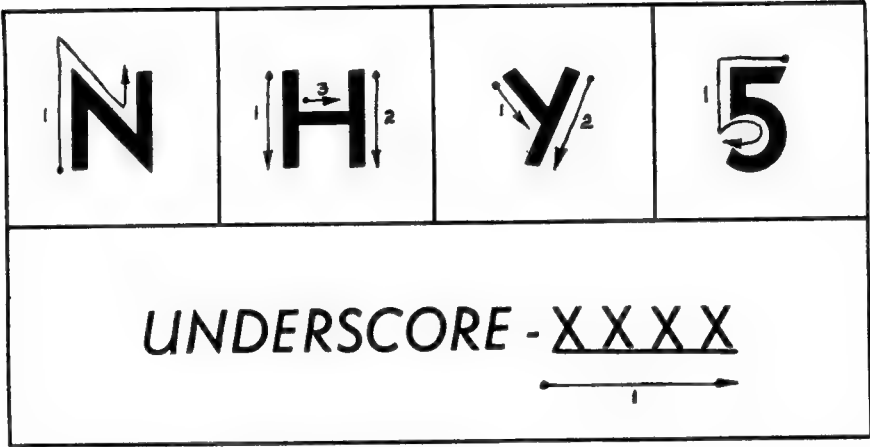
- (10) Concentrate upon the sound of the characters in the following exercise while printing the characters. Do not crowd the printing, make the characters small, neat and legible:

4 T G B	4 T G B	4 T G B	4 T G B	4 T G B
T G B 4	T G B 4	T G B 4	T G B 4	T G B 4
G B 4 T	G B 4 T	G B 4 T	G B 4 T	G B 4 T
B 4 T G	B 4 T G	B 4 T G	B 4 T G	B 4 T G

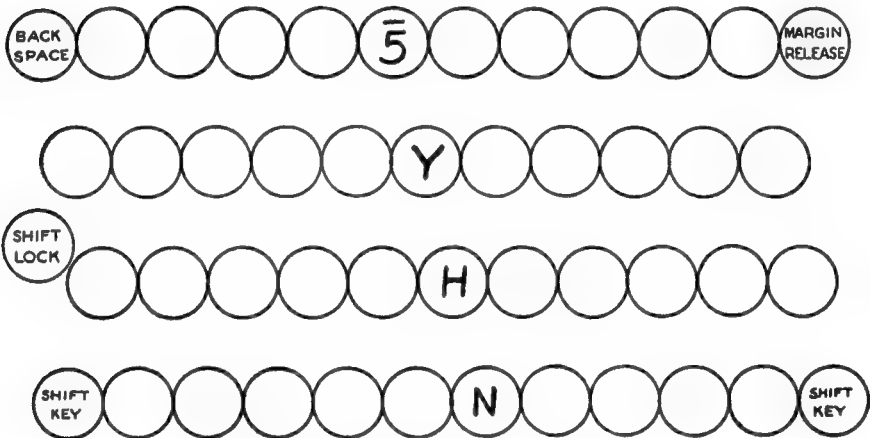
- (11) Concentrate upon the sound of the characters in exercise 10 while smartly tapping the first finger of your left hand upon the table top as each character is recognized.

Review the exercises, take particular note of the sequence of operations and the progress made. Thoroughly review any exercise which you do not fully understand or are unable to perform with ease and precision.

CHARACTER GROUP PRACTICE A-2



Method of printing characters.



Keyboard position of characters.

- (1) Repeat three times, slowly and distinctly, the following character sounds:

DAHDIT DAHDIT DAHDIT DAHDIT DAHDIT DITDITDITDIT
 DITDITDITDIT DITDITDITDIT DITDITDITDIT
 DITDITDITDIT DAHDITDAHDAH DAHDITDAHDAH
 DAHDITDAHDAH DAHDITDAHDAH DAHDITDAHDAH

DITDITDITDITDIT DITDITDITDITDIT DITDITDITDITDIT
DITDITDITDITDIT DITDITDITDITDIT
DITDITDAHDAHDIITDAH DITDITDAHDAHDIITDAH
DITDITDAHDAHDIITDAH DITDITDAHDAHDIITDAH
DITDITDAHDAHDIITDAH DAHDIT DAHDIT DITDITDITDIT
DITDITDITDIT DAHDITDAHDAH DAHDITDAHDAH
DITDITDITDITDIT DITDITDITDITDIT
DITDITDAHDAHDIITDAH DITDITDAHDAHDIITDAH DAHDIT
DITDITDITDIT DAHDITDAHDAH DITDITDITDITDIT
DITDITDAHDAHDIITDAH DAHDIT DITDITDITDIT
DAHDITDAHDAH DITDITDITDITDIT DITDITDAHDAHDIITDAH

- (2) Print five lines of the letter “N” while repeating slowly and distinctly the character sound DAHDIT:

NN
NN
NN
NN
NN

- (3) Print five lines of the letter “H” while repeating slowly and distinctly the character sound DITDITDITDIT:

[illegible]

- (4) Print five lines of the letter “Y” while repeating slowly and distinctly the character sound DAHDITDAHDAH:

YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
 YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
 YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
 YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
 YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY

- (5) Print five lines of the numeral "5" while repeating slowly and distinctly the character sound DITDITDITDIT:

55
55
55
55
55

- (6) Print five lines of the International punctuation “—” (underline) while repeating slowly and distinctly the character sound DITDITDAHDAH DITDAH:

[illegible]

- (7) Study the keyboard of the group characters and memorize their relative position. Note that the characters are typed with the first finger of the right hand and that shifting of the typewriter carriage is only necessary when typing the International punctuation “—” (underscore).

- (8) Place your left hand flat upon the table top and smartly tap the first finger of your right hand upon the table while slowly and distinctly repeating the following exercise:

DITDITDAHDAHDITDAH DITDITDAHDAHDITDAH
DITDITDAHDAHDITDAH DITDITDAHDAHDITDAH
DITDITDAHDAHDITDAH DITDITDITDITDIT
DITDITDITDITDIT DITDITDITDITDIT DITDITDITDITDIT
DITDITDITDITDIT DAHDITDAHDAH DAHDITDAHDAH
DAHDITDAHDAH DAHDITDAHDAH DAHDITDAHDAH
DITDITDITDIT DITDITDITDIT DITDITDITDIT
DITDITDITDIT DITDITDITDIT DAHDIT DAHDIT DAHDIT
DAHDIT DAHDIT DITDITDAHDAHDITDAH
DITDITDITDITDIT DAHDITDAHDAH DITDITDITDIT
DAHDIT DITDITDAHDAHDITDAH DITDITDITDITDIT
DAHDITDAHDAH DITDITDITDIT DAHDIT

- (9) Place your left hand flat upon the table top and smartly tap the first finger of your right hand upon the table while slowly and distinctly repeating the character sounds of the following exercise:

N H Y 5 _	N H Y 5 _	N H Y 5 _	N H Y 5 _
H Y 5 _ N	H Y 5 _ N	H Y 5 _ N	H Y 5 _ N
Y 5 _ N H	Y 5 _ N H	Y 5 _ N H	Y 5 _ N H
5 _ N H Y	5 _ N H Y	5 _ N H Y	5 _ N H Y
_ N H Y 5	_ N H Y 5	_ N H Y 5	_ N H Y 5

- (10) Repeat slowly and distinctly the following character sounds while printing the characters for which they stand. Do not crowd the printing, make the characters small, neat and legible, concentrate upon the character sound and the direction and order of pencil movement:

DAHDIT DITDITDITDIT DAHDITDAHDAH
 DITDITDITDITDIT DITDITDAHDAHDAHDITDAH DITDITDITDIT
 DAHDITDAHDAH DITDITDITDITDIT DITDITDAHDAHDAHDITDAH
 DAHDIT DAHDITDAHDAH DITDITDITDITDIT
 DITDITDAHDAHDAHDITDAH DAHDIT DITDITDITDIT
 DITDITDITDITDIT DITDITDAHDAHDAHDITDAH DAHDIT
 DITDITDITDIT DAHDITDAHDAH DITDITDAHDAHDAHDITDAH
 DAHDIT DITDITDITDIT DAHDITDAHDAH
 DITDITDITDITDIT DAHDIT DITDITDITDIT DAHDITDAHDAH
 DITDITDITDITDIT DITDITDAHDAHDAHDITDAH
 DITDITDITDIT DAHDITDAHDAH
 DITDITDITDITDIT DITDITDAHDAHDAHDITDAH DAHDIT
 DAHDITDAHDAH DITDITDITDITDIT DITDITDAHDAHDAHDITDAH
 DAHDIT DITDITDITDIT DAHDITDAHDAH
 DITDITDAHDAHDAHDITDAH DAHDIT DITDITDITDIT
 DAHDITDAHDAH DITDITDITDITDIT DITDITDAHDAHDAHDITDAH

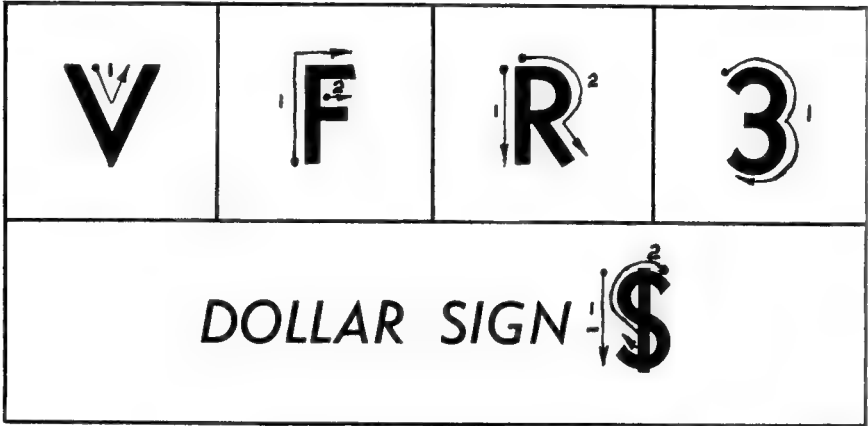
- (11) Concentrate upon the sound of the characters in the following exercise while printing the characters. Do not crowd the printing, make the characters small, neat and legible:

_ 5 Y H N	_ 5 Y H N	_ 5 Y H N	_ 5 Y H N
5 Y H N _	5 Y H N _	5 Y H N _	5 Y H N _
Y H N _ 5	Y H N _ 5	Y H N _ 5	Y H N _ 5
H N _ 5 Y	H N _ 5 Y	H N _ 5 Y	H N _ 5 Y
N _ 5 Y H	N _ 5 Y H	N _ 5 Y H	N _ 5 Y H

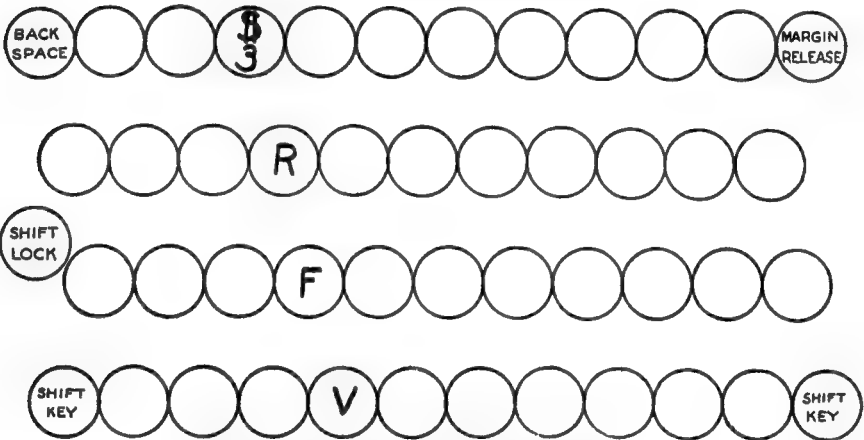
- (12) Concentrate upon the sound of the characters in exercise 11 while smartly tapping the first finger of the right hand upon the table top as each character is recognized.

Review the exercises, take particular note of the sequence of operations and the progress made. Thoroughly review any exercise which you do not fully understand or are unable to perform with ease and precision.

CHARACTER GROUP PRACTICE A-3



Method of printing characters.



Keyboard position of characters.

- (1) Repeat three times, slowly and distinctly, the following character sounds:

DITDITDITDAH DITDITDITDAH DITDITDITDAH
 DITDITDITDAH DITDITDITDAH DITDITDAHDIT
 DITDITDAHDIT DITDITDAHDIT DITDITDAHDIT
 DITDITDAHDIT DITDAHDIT DITDAHDIT DITDAHDIT
 DITDAHDIT DITDAHDIT DITDITDITDAHDAH

DITDITDITDAHDAH DITDITDITDAHDAH
DITDITDITDAHDAH DITDITDITDAHDAH
DITDITDITDAHDITDITDAH DITDITDITDAHDITDITDAH
DITDITDITDAHDITDITDAH DITDITDITDAHDITDITDAH
DITDITDITDAHDITDITDAH DITDITDITDAH
DITDITDITDAH DITDITDAHDIT DITDITDAHDIT
DITDAHDIT DITDAHDIT DITDITDITDAHDAH
DITDITDITDAHDAH DITDITDITDAHDITDITDAH
DITDITDITDAHDITDITDAH DITDITDITDAH DITDITDAHDIT
DITDAHDIT DITDITDITDAHDAH DITDITDITDAHDITDITDAH
DITDITDITDAH DITDITDAHDIT DITDAHDIT
DITDITDITDAHDAH DITDITDITDAHDITDITDAH

- (2) Print five lines of the letter “V” while repeating slowly and distinctly the character sound DITDITDITDAH:

[illegible]

- (3) Print five lines of the letter “F” while repeating slowly and distinctly the character sound DITDITDAHDIT:

[illegible]

- (4) Print five lines of the letter “R” while repeating slowly and distinctly the character sound DITDAH DIT:

[illegible]

- (5) Print five lines of the numeral "3" while repeating slowly and distinctly the character sound DITDITDITDAHDAH:

[illegible]

- (6) Print five lines of the International punctuation “\$” (dollar sign) while repeating slowly and distinctly the character sound DITDITDITDAH DITDITDAH:

[illegible]

- (7) Study the keyboard of the group characters and memorize their relative position. Note that the characters are typed with the first finger of the left hand and that shifting of the typewriter carriage is only necessary when typing the International punctuation “\$” (dollar sign).

- (8) Place your right hand flat upon the table top and smartly tap the first finger of your left hand upon the table while slowly and distinctly repeating the following exercise:

DITDITDITDAHDITDITDAH DITDITDITDAHDITDITDAH
DITDITDITDAHDITDITDAH DITDITDITDAHDITDITDAH
DITDITDITDAHDITDITDAH DITDITDITDAHDAH
DITDITDITDAHDAH DITDITDITDAHDAH DITDITDITDAHDAH
DITDITDITDAHDAH DITDAHDIT DITDAHDIT DITDAHDIT
DITDAHDIT DITDAHDIT DITDITDAHDIT DITDITDAHDIT
DITDITDAHDIT DITDITDAHDIT DITDITDAHDIT
DITDITDITDAH DITDITDITDAH DITDITDITDAH
DITDITDITDAH DITDITDITDAH DITDITDITDAHDITDITDAH
DITDITDITDAHDITDITDAH DITDITDITDAHDAH

DITDITDITDAHDAH DITDAHDIT DITDAHDIT
 DITDITDAHDIT DITDITDAHDIT DITDITDITDAH
 DITDITDITDAH DITDITDITDAHDITDITDAH
 DITDITDITDAHDAH DITDAHDIT DITDITDAHDIT
 DITDITDITDAH DITDITDITDAHDITDITDAH
 DITDITDITDAHDAH DITDAHDIT DITDITDAHDIT
 DITDITDITDAH

- (9) Place your right hand flat upon the table top and smartly tap the first finger of your left hand upon the table while slowly and distinctly repeating the character sounds of the following exercise:

V F R 3 \$	V F R 3 \$	V F R 3 \$	V F R 3 \$
F R 3 \$ V	F R 3 \$ V	F R 3 \$ V	F R 3 \$ V
R 3 \$ V F	R 3 \$ V F	R 3 \$ V F	R 3 \$ V F
3 \$ V F R	3 \$ V F R	3 \$ V F R	3 \$ V F R
\$ V F R 3	\$ V F R 3	\$ V F R 3	\$ V F R 3

- (10) Repeat slowly and distinctly the following character sounds while printing the characters for which they stand. Do not crowd the printing, make the characters small, neat and legible, concentrate upon the character sound and the direction and order of pencil movement:

DITDITDITDAH DITDITDAHDIT DITDAHDIT
 DITDITDITDAHDAH DITDITDITDAHDITDITDAH
 DITDITDAHDIT DITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDITDITDAH DITDITDITDAH DITDAHDIT
 DITDITDITDAHDAH DITDITDITDAHDITDITDAH
 DITDITDITDAH DITDITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDITDITDAH DITDITDITDAH DITDITDAHDIT
 DITDAHDIT DITDITDITDAHDITDITDAH DITDITDITDAH
 DITDITDAHDIT DITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDITDITDAH DITDITDITDAH DITDITDAHDIT
 DITDAHDIT DITDITDITDAHDAH DITDITDITDAHDITDITDAH
 DITDITDAHDIT DITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDITDITDAH DITDITDITDAH DITDAHDIT

DITDITDITDAHDAH DITDITDITDAHDITDITDAH
 DITDITDITDAH DITDITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDITDITDAH DITDITDITDAH DITDITDAHDIT
 DITDAHDIT DITDITDITDAHDITDITDAH DITDITDITDAH
 DITDITDAHDIT DITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDITDITDAH

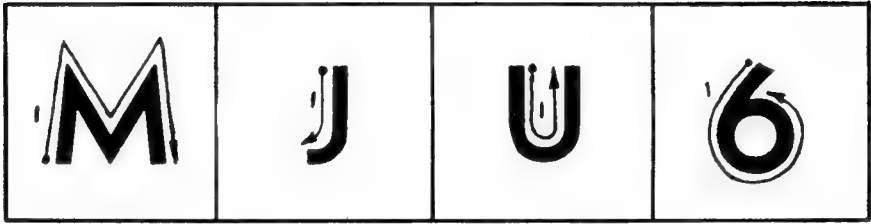
- (11) Concentrate upon the sound of the characters in the following exercise while printing the characters. Do not crowd the printing, make the characters small, neat and legible:

\$ 3 R F V	\$ 3 R F V	\$ 3 R F V	\$ 3 R F V
3 R F V \$	3 R F V \$	3 R F V \$	3 R F V \$
R F V \$ 3	R F V \$ 3	R F V \$ 3	R F V \$ 3
F V \$ 3 R	F V \$ 3 R	F V \$ 3 R	F V \$ 3 R
V \$ 3 R F	V \$ 3 R F	V \$ 3 R F	V \$ 3 R F

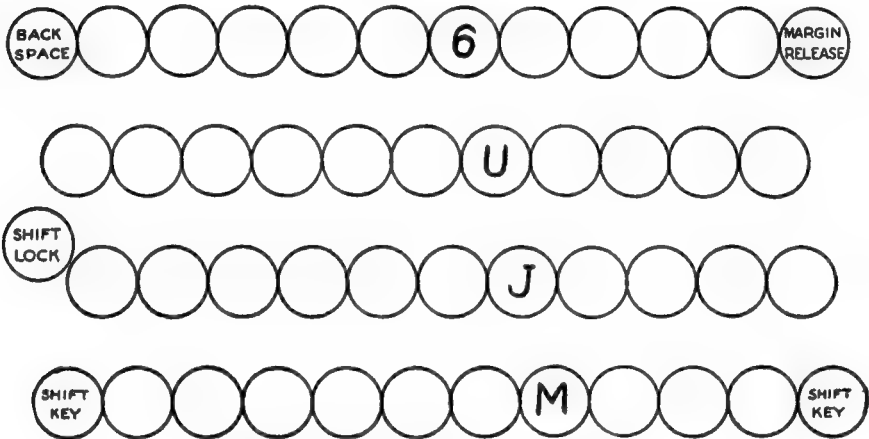
- (12) Concentrate upon the sound of the characters in exercise 11 while smartly tapping the first finger of the left hand upon the table top as each character is recognized.

Review the exercises, take particular note of the sequence of operations and the progress made. Thoroughly review any exercise which you do not fully understand or are unable to perform with ease and precision.

CHARACTER GROUP PRACTICE A-4



Method of printing characters.



Keyboard position of characters.

- (1) Repeat three times, slowly and distinctly, the following character sounds:

DAHDAH DAHDAH DAHDAH DAHDAH DAHDAH DITDAHDAHDAH
 DITDAHDAHDAH DITDAHDAHDAH DITDAHDAHDAH
 DITDAHDAHDAH DITDITDAH DITDITDAH DITDITDAH
 DITDITDAH DITDITDAH DAHDITDITDITDIT
 DAHDITDITDITDIT DAHDITDITDITDIT DAHDITDITDITDIT
 DAHDITDITDITDIT DAHDAH DAHDAH DITDAHDAHDAH
 DITDAHDAHDAH DITDITDAH DITDITDAH
 DAHDITDITDITDIT DAHDITDITDITDIT DAHDAH
 DITDAHDAHDAH DITDITDAH DAHDITDITDITDIT DAHDAH
 DITDAHDAHDAH DITDITDAH DAHDITDITDITDIT

- (2) Print five lines of the letter “M” while repeating slowly and distinctly the character sound DAHD AH:

MM
 MMM
 MMM
 MMM
 MMM

- (3) Print five lines of the letter “J” while repeating slowly and distinctly the character sound DITDAHDAH:

JJJ
 JJJ
 JJJ
 JJJ
 JJJ

- (4) Print five lines of the letter “U” while repeating slowly and distinctly the character sound DITDITDAH:

UU
 UUU
 UUU
 UUU
 UUU

- (5) Print five lines of the numeral “6” while repeating slowly and distinctly the character sound DAHDITDITDIT:

666
 666
 666
 666
 666

- (6) Study the keyboard of the group characters and memorize their relative position. Note that the characters are typed with the first finger of the right hand and that no shifting of the typewriter carriage is necessary for this particular group.

- (7) Place your left hand flat upon the table top and smartly tap the first finger of your right hand upon the table while slowly and distinctly repeating the following exercise:

DAHDITDITDITDIT DAHDITDITDITDIT DAHDITDITDITDIT
 DAHDITDITDITDIT DAHDITDITDITDIT DITDITDAH
 DITDITDAH DITDITDAH DITDITDAH DITDITDAH
 DITDAHDAHDAH DITDAHDAHDAH DITDAHDAHDAH
 DITDAHDAHDAH DITDAHDAHDAH DAHDAH DAHDAH DAHDAH
 DAHDAH DAHDAH DAHDITDITDITDIT DAHDITDITDITDIT
 DITDITDAH DITDITDAH DITDAHDAHDAH DITDAHDAHDAH
 DAHDAH DAHDAH DAHDITDITDITDIT DITDITDAH
 DITDAHDAHDAH DAHDAH DAHDITDITDITDIT DITDITDAH
 DITDAHDAHDAH DAHDAH

- (8) Place your left hand flat upon the table top and smartly tap the first finger of your right hand upon the table while slowly and distinctly repeating the character sounds of the following exercise:

M J U 6	M J U 6	M J U 6	M J U 6	M J U 6
J U 6 M	J U 6 M	J U 6 M	J U 6 M	J U 6 M
U 6 M J	U 6 M J	U 6 M J	U 6 M J	U 6 M J
6 M J U	6 M J U	6 M J U	6 M J U	6 M J U

- (9) Repeat slowly and distinctly the following character sounds while printing the characters for which they stand. Do not crowd the printing, make the characters small, neat and legible, concentrate upon the character sound and the direction and order of pencil movement:

DAHDAH DITDAHDAHDAH DITDITDAH DAHDITDITDITDIT
 DITDAHDAHDAH DITDITDAH DAHDITDITDITDIT DAHDAH
 DITDITDAH DAHDITDITDITDIT DAHDAH DITDAHDAHDAH
 DAHDITDITDITDIT DAHDAH DITDAHDAHDAH DITDITDAH
 DAHDAH DITDAHDAHDAH DITDITDAH DAHDITDITDITDIT
 DITDAHDAHDAH DITDITDAH DAHDITDITDITDIT DAHDAH
 DITDITDAH DAHDITDITDITDIT DAHDAH DITDAHDAHDAH
 DAHDITDITDITDIT DAHDAH DITDAHDAHDAH DITDITDAH

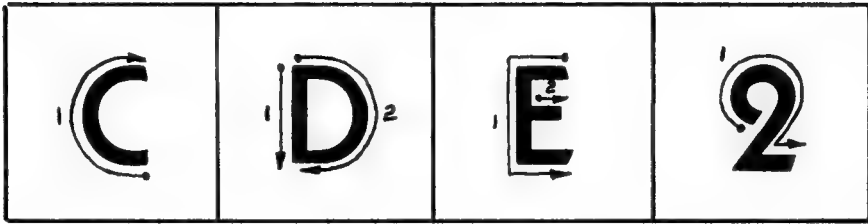
- (10) Concentrate upon the sound of the characters in the following exercise while printing the characters. Do not crowd the printing, make the characters small, neat and legible:

6 U J M	6 U J M	6 U J M	6 U J M	6 U J M
U J M 6	U J M 6	U J M 6	U J M 6	U J M 6
J M 6 U	J M 6 U	J M 6 U	J M 6 U	J M 6 U
M 6 U J	M 6 U J	M 6 U J	M 6 U J	M 6 U J

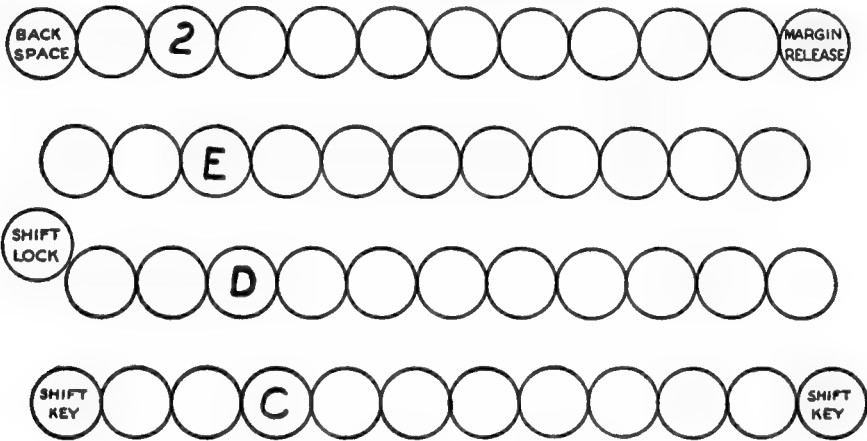
- (11) Concentrate upon the sound of the characters in exercise 10 while smartly tapping the first finger of the right hand upon the table top as each character is recognized.

Review the exercises, take particular note of the sequence of operations and the progress made. Thoroughly review any exercise which you do not fully understand or are unable to perform with ease and precision.

CHARACTER GROUP PRACTICE A-5



Method of printing characters.



Keyboard position of characters.

- (1) Repeat three times, slowly and distinctly, the following character sounds :

DAHDITDAHDIT DAHDITDAHDIT DAHDITDAHDIT
 DAHDITDAHDIT DAHDITDAHDIT DAHDITDIT DAHDITDIT
 DAHDITDIT DAHDITDIT DAHDITDIT DIT DIT DIT DIT
 DIT DITDITDAHDAHDAH DITDITDAHDAHDAH
 DITDITDAHDAHDAH DITDITDAHDAHDAH DITDITDAHDAHDAH
 DAHDITDAHDIT DAHDITDAHDIT DAHDITDIT DAHDITDIT
 DIT DIT DITDITDAHDAHDAH DITDITDAHDAHDAH
 DAHDITDAHDIT DAHDITDIT DIT DITDITDAHDAHDAH
 DAHDITDAHDIT DAHDITDIT DIT DITDITDAHDAHDAH

- (2) Print five lines of the letter “C” while repeating slowly and distinctly the character sound DAHDITDAHDIT:

CC
 CCC
 CCC
 CCC
 CCC

- (3) Print five lines of the letter “D” while repeating slowly and distinctly the character sound DAHDITDIT:

DD
 DDD
 DDD
 DDD
 DDD

- (4) Print five lines of the letter “E” while repeating slowly and distinctly the character sound DIT:

EE
 EEE
 EEE
 EEE
 EEE

- (5) Print five lines of the numeral “2” while repeating slowly and distinctly the character sound DITDITDAHDAHDAH:

222
 222
 222
 222
 222

- (6) Study the keyboard of the group characters and memorize their relative position. Note that the characters are typed with the second finger of the left hand and that no shifting of the typewriter carriage is necessary for this particular group.

- (7) Place your right hand flat upon the table top and smartly tap the second finger of your left hand upon the table while slowly and distinctly repeating the following exercise: (Perform this exercise at least twice)

DITDITDAHDAHDAH DITDITDAHDAHDAH DITDITDAHDAHDAH
 DITDITDAHDAHDAH DITDITDAHDAHDAH DIT DIT DIT DIT
 DIT DAHDITDIT DAHDITDIT DAHDITDIT DAHDITDIT
 DAHDITDIT DAHDITDAHDIT DAHDITDAHDIT
 DAHDITDAHDIT DAHDITDAHDIT DAHDITDAHDIT
 DITDITDAHDAHDAH DITDITDAHDAHDAH DIT DIT
 DAHDITDIT DAHDITDIT DAHDITDAHDIT DAHDITDAHDIT
 DITDITDAHDAHDAH DIT DAHDITDIT DAHDITDAHDIT
 DITDITDAHDAHDAH DIT DAHDITDIT DAHDITDAHDIT

- (8) Place your right hand flat upon the table top and smartly tap the second finger of your left hand upon the table while slowly and distinctly repeating the character sound of the following exercise: (Perform this exercise at least twice)

C D E 2	C D E 2	C D E 2	C D E 2	C D E 2
D E 2 C	D E 2 C	D E 2 C	D E 2 C	D E 2 C
E 2 C D	E 2 C D	E 2 C D	E 2 C D	E 2 C D
2 C D E	2 C D E	2 C D E	2 C D E	2 C D E

- (9) Repeat slowly and distinctly the following character sounds while printing the characters for which they stand. Do not crowd the printing, make the characters small, neat and legible, concentrate upon the character sound and the direction and order of pencil movement:

DAHDITDAHDIT DAHDITDIT DIT DITDITDAHDAHDAH
 DAHDITDIT DIT DITDITDAHDAHDAH DAHDITDAHDIT DIT
 DITDITDAHDAHDAH DAHDITDAHDIT DAHDITDIT
 DITDITDAHDAHDAH DAHDITDAHDIT DAHDITDIT DIT
 DITDITDAHDAHDAH DAHDITDIT DIT DITDITDAHDAHDAH
 DAHDITDAHDIT DIT DITDITDAHDAHDAH DAHDITDAHDIT
 DAHDITDIT DIT DITDITDAHDAHDAH

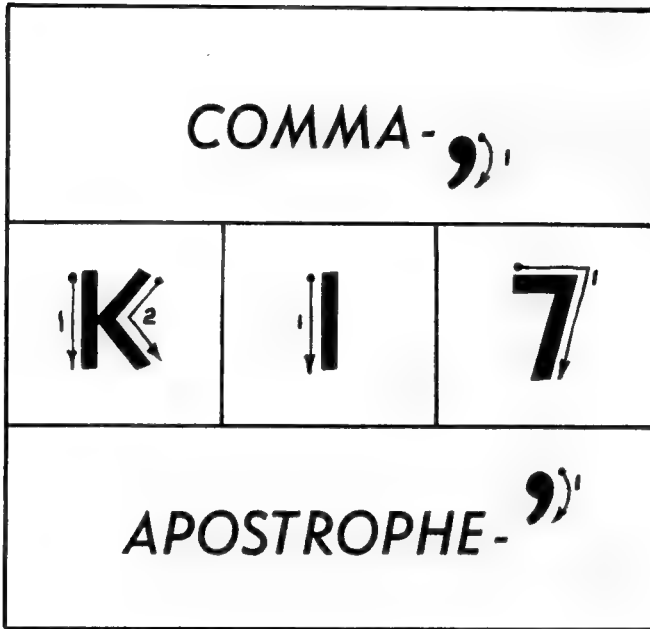
- (10) Concentrate upon the sound of the characters in the following exercise while printing the characters.. Do not crowd the printing, make the characters small, neat and legible:

2 E D C	2 E D C	2 E D C	2 E D C	2 E D C
E D C 2	E D C 2	E D C 2	E D C 2	E D C 2
D C 2 E	D C 2 E	D C 2 E	D C 2 E	D C 2 E
C 2 E D	C 2 E D	C 2 E D	C 2 E D	C 2 E D

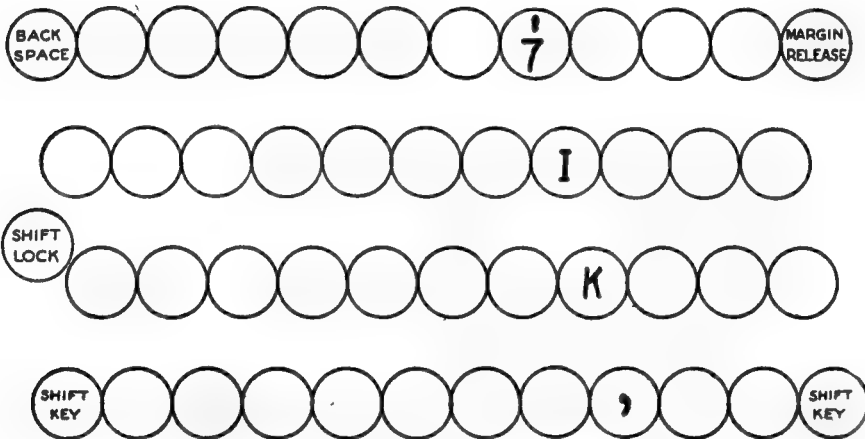
- (11) Concentrate upon the sound of the characters in exercise 10 while smartly tapping the second finger of your left hand upon the table top as each character is recognized.

Review the exercises, take particular note of the sequence of operations and the progress made. Thoroughly review any exercise which you do not fully understand or are unable to perform with ease and precision.

CHARACTER GROUP PRACTICE A-6



Method of printing characters.



Keyboard position of characters.

- (1) Repeat three times, slowly and distinctly, the following character sounds:

DAHDAHDITDITDAHDAH DAHDAHDITDITDAHDAH
DAHDAHDITDITDAHDAH DAHDAHDITDITDAHDAH
DAHDAHDITDITDAHDAH DAHDITDAH DAHDITDAH
DAHDITDAH DAHDITDAH DAHDITDAH DITDIT DITDIT
DITDIT DITDIT DITDIT DAHDAHDITDITDIT
DAHDAHDITDITDIT DAHDAHDITDITDIT DAHDAHDITDITDIT
DAHDAHDITDITDIT DITDAHDAHDAHDAHDIT
DITDAHDAHDAHDAHDIT DITDAHDAHDAHDAHDIT
DITDAHDAHDAHDAHDIT DITDAHDAHDAHDAHDIT
DAHDAHDITDITDAHDAH DAHDAHDITDITDAHDAH
DAHDITDAH DAHDITDAH DITDIT DITDIT
DAHDAHDITDITDIT DAHDAHDITDITDIT
DITDAHDAHDAHDAHDIT DITDAHDAHDAHDAHDIT
DAHDAHDITDITDAHDAH DAHDITDAH DITDIT
DAHDAHDITDITDIT DITDAHDAHDAHDAHDIT
DAHDAHDITDITDAHDAH DAHDITDAH DITDIT
DAHDAHDITDITDIT DITDAHDAHDAHDAHDIT

- (2) Print five lines of the International punctuation “,” (comma) while repeating slowly and distinctly the character sound DAHDAH DITDITDAHDAH:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

- (3) Print five lines of the letter “K” while repeating slowly and distinctly the character sound DAHDITDAH:

[illegible]

- (4) Print five lines of the letter "I" while repeating slowly and distinctly the character sound DITDIT:

I
I
I
I
I

- (5) Print five lines of the numeral “7” while repeating slowly and distinctly the character sound DAHDAH DITDITDIT:

777
777
777
777
777

- (6) Print five lines of the International punctuation “ ’ ” (apostrophe) while repeating slowly and distinctly the character sound DITDAHDAHDAHDIT:

.....

.....

.....

.....

.....

- (7) Study the keyboard of the group characters and memorize their relative position. Note that the characters are typed with the second finger of the right hand and that shifting of the typewriter carriage is only necessary when typing the International punctuation “ ’ ” (apostrophe).

- (8) Place your left hand flat upon the table top and smartly tap the second finger of your right hand upon the table while slowly and distinctly repeating the following exercise: (Perform this exercise at least twice)

DITDAHDAHDAHDAH DITDAHDAHDAHDAH DITDAHDAHDAHDAH DITDAHDAHDAHDAH

DITDAHDAHDAHDAHDIT DAHDAHDITDITDIT
 DAHDAHDITDITDIT DAHDAHDITDITDIT DAHDAHDITDITDIT
 DAHDAHDITDITDIT DITDIT DITDIT DITDIT DITDIT
 DITDIT DAHDITDAH DAHDITDAH DAHDITDAH DAHDITDAH
 DAHDITDAH DAHDAHDITDITDAHDAH DAHDAHDITDITDAHDAH
 DAHDAHDITDITDAHDAH DAHDAHDITDITDAHDAH
 DAHDAHDITDITDAHDAH DITDAHDAHDAHDAHDIT
 DITDAHDAHDAHDAHDIT DAHDAHDITDITDIT
 DAHDAHDITDITDIT DITDIT DITDIT DAHDITDAH
 DAHDITDAH DAHDAHDITDITDAHDAH DAHDAHDITDITDAHDAH

- (9) Place your left hand flat upon the table top and smartly tap the second finger of your right hand upon the table while slowly and distinctly repeating the character sounds of the following exercise: (Perform this exercise at least twice)

, K I 7 ' , K I 7 ' , K I 7 ' , K I 7 '
 K I 7 ' , K I 7 ' , K I 7 ' , K I 7 '
 I 7 ' , K I 7 ' , K I 7 ' , K I 7 '
 7 ' , K I 7 ' , K I 7 ' , K I 7 '
 ' , K I 7 ' , K I 7 ' , K I 7 '

- (10) Repeat slowly and distinctly the following character sounds while printing the characters for which they stand. Do not crowd the printing, make the characters small, neat and legible, concentrate upon the character sound and the direction and order of pencil movement:

DAHDAHDITDITDAHDAH DAHDITDAH DITDIT
 DAHDAHDITDITDIT DITDAHDAHDAHDAHDIT DAHDITDAH
 DITDIT DAHDAHDITDITDIT DITDAHDAHDAHDAHDIT
 DAHDAHDITDITDAHDAH DITDIT DAHDAHDITDITDIT
 DITDAHDAHDAHDAHDIT DAHDITDAH DAHDAHDITDITDIT
 DITDAHDAHDAHDAHDIT DAHDAHDITDITDAHDAH DAHDITDAH
 DITDIT DITDAHDAHDAHDAHDIT DAHDAHDITDITDAHDAH
 DAHDITDAH DITDIT DAHDAHDITDITDIT
 DITDAHDAHDAHDAHDIT DAHDITDAH DITDIT
 DAHDAHDITDITDIT DITDAHDAHDAHDAHDIT

DAHDAH DITDIT DAHDAH DAHDITDAH DAHDAH DITDIT DIT
 DITDAH DAHDAH DAHDIT DAHDAH DITDIT DAHDAH DAHDITDAH
 DITDIT DITDAH DAHDAH DAHDIT DAHDAH DITDIT DAHDAH
 DAHDITDAH DITDIT DAHDAH DITDIT DIT
 DITDAH DAHDAH DAHDIT

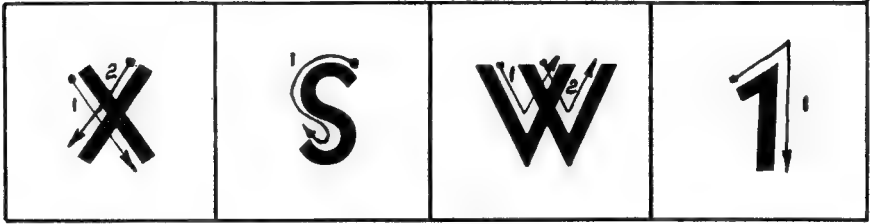
- (11) Concentrate upon the sound of the characters in the following exercise while printing the characters. Do not crowd the printing, make the characters small, neat and legible:

' 7 I K , ' 7 I K , ' 7 I K , ' 7 I K ,
 7 I K , ' 7 I K , ' 7 I K , ' 7 I K , '
 I K , ' 7 I K , ' 7 I K , ' 7 I K , ' 7
 K , ' 7 I K , ' 7 I K , ' 7 I K , ' 7 I
 , ' 7 I K , ' 7 I K , ' 7 I K , ' 7 I K

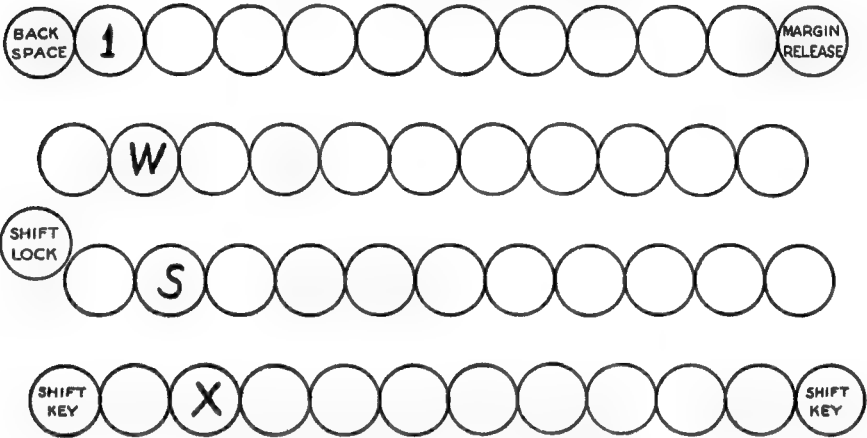
- (12) Concentrate upon the sound of the characters in exercise 11 while smartly tapping the second finger of the right hand upon the table top as each character is recognized.

Review the exercises, take particular note of the sequence of operations and the progress made. Thoroughly review any exercise which you do not fully understand or are unable to perform with ease and precision.

CHARACTER GROUP PRACTICE A-7



Method of printing characters.



Keyboard position of characters.

- (1) Repeat three times, slowly and distinctly, the following character sounds:

DAHDITDITDAH DAHDITDITDAH DAHDITDITDAH
 DAHDITDITDAH DAHDITDITDAH DITDITDIT DITDITDIT
 DITDITDIT DITDITDIT DITDITDIT DITDAHDAH
 DITDAHDAH DITDAHDAH DITDAHDAH DITDAHDAH
 DITDAHDAHDAHDAH DITDAHDAHDAHDAH DITDAHDAHDAHDAH
 DITDAHDAHDAHDAH DAHDITDITDAH DAHDITDITDAH
 DITDITDIT DITDITDIT DITDAHDAH DITDAHDAH
 DITDAHDAHDAHDAH DITDAHDAHDAHDAH DAHDITDITDAH
 DITDITDIT DITDAHDAH DITDAHDAHDAHDAH
 DAHDITDITDAH DITDITDIT DITDAHDAH
 DITDAHDAHDAHDAH

- (2) Print five lines of the letter “X” while repeating slowly and distinctly the character sound DAHDITDITDAH:

XX
 XX
 XX
 XX
 XX

- (3) Print five lines of the letter “S” while repeating slowly and distinctly the character sound DITDITDIT:

SS
 SSS
 SSS
 SSS
 SSS

- (4) Print five lines of the letter “W” while repeating slowly and distinctly the character sound DITDAHDAH:

WW
 WWW
 WWW
 WWW
 WWW

- (5) Print five lines of the numeral “1” while repeating slowly and distinctly the character sound DITDAHDAHDAHDAH:

111
 111
 111
 111
 111

- (6) Study the keyboard of the group characters and memorize their relative position. Note that the characters are typed with the third finger of the left hand and that no shifting of the typewriter carriage is necessary for this particular group.

- (7) Place your right hand flat upon the table top and smartly tap the third finger of your left hand upon the table while slowly and distinctly repeating the following exercise: (Perform this exercise at least three times)

DITDAHDAHDAH DITDAHDAHDAH DITDAHDAHDAH
 DITDAHDAHDAH DITDAHDAHDAH DITDAHDAH
 DITDAHDAH DITDAHDAH DITDAHDAH DITDAHDAH
 DITDITDIT DITDITDIT DITDITDIT DITDITDIT
 DITDITDIT DAHDITDITDAH DAHDITDITDAH
 DAHDITDITDAH DAHDITDITDAH DAHDITDITDAH
 DITDAHDAHDAH DITDAHDAHDAH DITDAHDAH
 DITDAHDAH DITDITDIT DITDITDIT DAHDITDITDAH
 DAHDITDITDAH DITDAHDAHDAH DITDAHDAH
 DITDITDIT DAHDITDITDAH DITDAHDAHDAH
 DITDAHDAH DITDITDIT DAHDITDITDAH

- (8) Place your right hand flat upon the table top and smartly tap the third finger of your left hand upon the table while slowly and distinctly repeating the character sounds of the following exercise: (Perform this exercise at least three times)

X S W 1	X S W 1	X S W 1	X S W 1	X S W 1
S W 1 X	S W 1 X	S W 1 X	S W 1 X	S W 1 X
W 1 X S	W 1 X S	W 1 X S	W 1 X S	W 1 X S
1 X S W	1 X S W	1 X S W	1 X S W	1 X S W

- (9) Repeat slowly and distinctly the following character sounds while printing the characters for which they stand. Do not crowd the printing, make the characters small, neat and legible, concentrate upon the character sound and the direction and order of pencil movement:

DAHDITDITDAH DITDITDIT DITDAHDAH
 DITDAHDAHDAH DITDITDIT DITDAHDAH
 DITDAHDAHDAH DAHDITDITDAH DITDAHDAH
 DITDAHDAHDAH DAHDITDITDAH DITDITDIT
 DITDAHDAHDAH DAHDITDITDAH DITDITDIT
 DITDAHDAH DITDAHDAHDAH DITDITDIT DITDAHDAH
 DITDAHDAHDAH DAHDITDITDAH DITDAHDAH

DITDAHDAHDAH DAHDITDITDAH DITDITDIT
 DITDAHDAHDAH DAHDITDITDAH DITDITDIT
 DITDAHDAH

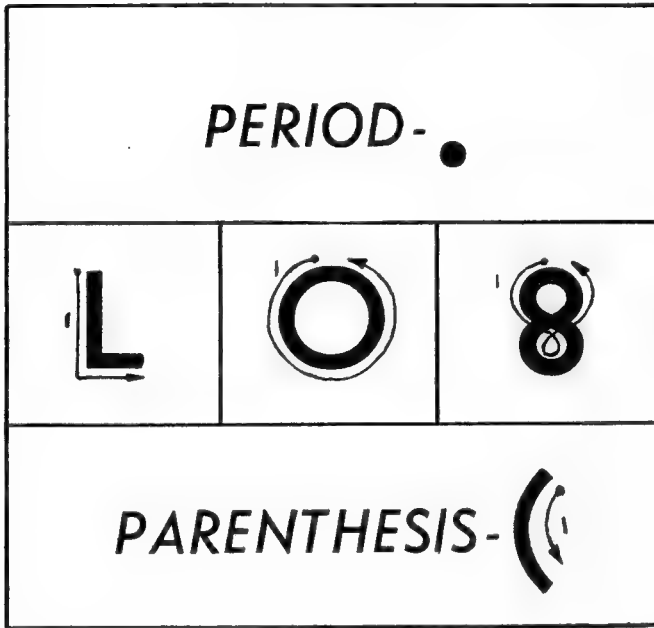
- (10) Concentrate upon the sound of the characters in the following exercise while printing the characters. Do not crowd the printing, make the characters small, neat and legible:

1 W S X	1 W S X	1 W S X	1 W S X	1 W S X
W S X 1	W S X 1	W S X 1	W S X 1	W S X 1
S X 1 W	S X 1 W	S X 1 W	S X 1 W	S X 1 W
X 1 W S	X 1 W S	X 1 W S	X 1 W S	X 1 W S

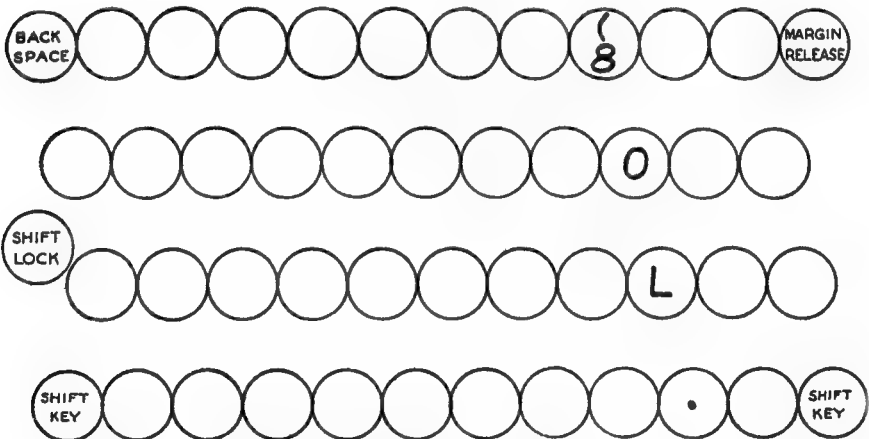
- (11) Concentrate upon the sound of the characters in exercise 10 while smartly tapping the third finger of your left hand upon the table top as each character is recognized.

Review the exercises, take particular note of the sequence of operations and the progress made. Thoroughly review any exercise which you do not fully understand or are unable to perform with ease and precision.

CHARACTER GROUP PRACTICE A-8



Method of printing characters.



Keyboard position of characters.

- (1) Repeat three times, slowly and distinctly, the following character sounds:

DITDAHDITDAHDITDAH DITDAHDITDAHDITDAH
DITDAHDITDAHDITDAH DITDAHDITDAHDITDAH
DITDAHDITDAHDITDAH DITDAHDITDIT DITDAHDITDIT
DITDAHDITDIT DITDAHDITDIT DITDAHDITDIT
DAHDAHDAH DAHDAHDAH DAHDAHDAH DAHDAHDAH
DAHDAHDAH DAHDAHDAH DITDIT DAHDAHDAH DITDIT
DAHDAHDAH DITDIT DAHDAHDAH DITDIT DAHDAHDAH DITDIT
DAH DITDAHDAH DITDAH DAH DITDAHDAH DITDAH
DAH DITDAHDAH DITDAH DAH DITDAHDAH DITDAH
DAH DITDAHDAH DITDAH DITDAH DITDAH DITDAH
DITDAH DITDAH DITDAH DITDAH DITDIT DITDAH DITDIT
DAHDAHDAH DAHDAHDAH DAHDAHDAH DITDIT
DAHDAHDAH DITDIT DAH DITDAHDAH DITDAH
DAH DITDAHDAH DITDAH DITDAH DITDAH DITDAH
DITDAH DITDIT DAHDAHDAH DAHDAHDAH DITDIT
DAH DITDAHDAH DITDAH

- (2) Print five lines of the International punctuation “.” (period) while repeating slowly and distinctly the character sound DITDAHDITDAHDITDAH:

.....

.....

.....

.....

.....

- (3) Print five lines of the letter “L” while repeating slowly and distinctly the character sound DITDAHDITDIT:

[illegible]

- (4) Print five lines of the letter "O" while repeating slowly and distinctly the character sound DAHDAHDAH:

OO
 OOO
 OOO
 OOO
 OOO

- (5) Print five lines of the numeral "8" while repeating slowly and distinctly the character sound DAHDAHDAH DITDIT:

888
 888
 888
 888
 888

- (6) Print three lines of the International punctuation "(" (parenthesis) while repeating slowly and distinctly the character sound DAHDITDAHDAHDITDAH:

(((((((
 ((((((((
 ((((((((

- (7) Study the keyboard of the group characters and memorize their relative position. Note that the characters are typed with the third finger of the right hand and that shifting of the typewriter carriage is only necessary when typing the International punctuation "(" (parenthesis).

- (8) Place your left hand flat upon the table top and smartly tap the third finger of your right hand upon the table while slowly and distinctly repeating the following exercise: (Perform this exercise at least three times)

DAH DITDAH DAHDITDAH DAHDITDAH DAHDITDAH DAHDITDAH
 DAHDAH DAHDITDIT DAHDAH DAHDITDIT DAHDAH DAHDITDIT
 DAHDAH DAHDITDIT DAHDAH DAHDITDIT DAHDAH DAH
 DAHDAH DAH DAHDAH DAH DAHDAH DAH DAHDAH DAH

DITDAHDITDIT DITDAHDITDIT DITDAHDITDIT
 DITDAHDITDIT DITDAHDITDIT DITDAHDITDAHDITDAH
 DITDAHDITDAHDITDAH DITDAHDITDAHDITDAH
 DITDAHDITDAHDITDAH DITDAHDITDAHDITDAH
 DAHDITDAHDAHDITDAH DAHDITDAHDAHDITDAH
 DAHDAHDAHDITDIT DAHDAHDAHDITDIT DAHDAHDAH
 DAHDAHDAH DITDAHDITDIT DITDAHDITDIT
 DITDAHDITDAHDITDAH DITDAHDITDAHDITDAH
 DAHDITDAHDAHDITDAH DAHDAHDAHDITDIT DAHDAHDAH
 DITDAHDITDIT DITDAHDITDAHDITDAH
 DAHDITDAHDAHDITDAH DAHDAHDAHDITDIT DAHDAHDAH
 DITDAHDITDIT DITDAHDITDAHDITDAH

- (9) Place your left hand flat upon the table top and smartly tap the third finger of your right hand upon the table while slowly and distinctly repeating the character sounds of the following exercise: (Perform this exercise at least three times)

. L O 8 ' .	. L O 8 ' .	. L O 8 ' .	. L O 8 ' .
L O 8 ' .	L O 8 ' .	L O 8 ' .	L O 8 ' .
O 8 ' . L	O 8 ' . L	O 8 ' . L	O 8 ' . L
8 ' . L O	8 ' . L O	8 ' . L O	8 ' . L O
' . L O 8	' . L O 8	' . L O 8	' . L O 8

- (10) Repeat slowly and distinctly the following character sounds while printing the characters for which they stand. Do not crowd the printing, make the characters small, neat and legible, concentrate upon the character sound and the direction and order of pencil movement:

DITDAHDITDAHDITDAH DITDAHDITDIT DAHDAHDAH
 DAHDAHDAHDITDIT DAHDITDAHDAHDITDAH DITDAHDITDIT
 DAHDAHDAH DAHDAHDAHDITDIT DAHDITDAHDAHDITDAH
 DITDAHDITDAHDITDAH DAHDAHDAH DAHDAHDAHDITDIT
 DAHDITDAHDAHDITDAH DITDAHDITDAHDITDAH
 DITDAHDITDIT DAHDAHDAH DAHDITDAHDAHDITDAH
 DITDAHDITDAHDITDAH DITDAHDITDIT DAHDAHDAH
 DAHDAHDAHDITDIT DITDAHDITDAHDITDAH DITDAHDITDIT

DAHDAHDAH DAHDAHDAHDITDIT DAHDITDAHDAHDITDAH
 DITDAH DITDIT DAHDAHDAH DAHDAHDAHDITDIT
 DAHDITDAHDAHDITDAH DITDAH DITDAH DITDAH DAHDAHDAH
 DAHDAHDAHDITDIT DAHDITDAHDAHDITDAH
 DITDAH DITDAH DITDAH DITDAH DITDIT DAHDAHDAHDITDIT
 DAHDITDAHDAHDITDAH DITDAH DITDAH DITDAH
 DITDAH DITDIT DAHDAHDAH DAHDAHDAHDITDIT
 DAHDITDAHDAHDITDAH DITDAH DITDAH DITDAH
 DITDAH DITDIT DAHDAHDAH DAHDAHDAHDITDIT
 DAHDITDAHDAHDITDAH

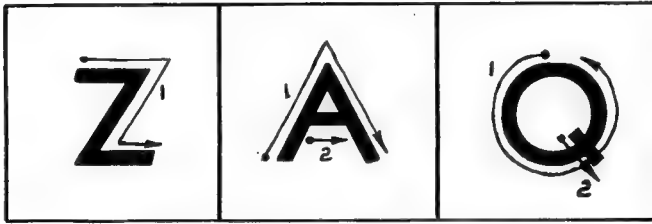
- (11) Concentrate upon the sound of the characters in the following exercise while printing the characters. Do not crowd the printing, make the characters small, neat and legible:

(8 0 L .	(8 0 L .	(8 0 L .	(8 0 L .
8 0 L . (	8 0 L . (	8 0 L . (	8 0 L . (
0 L . (8	0 L . (8	0 L . (8	0 L . (8
L . (8 0	L . (8 0	L . (8 0	L . (8 0
. (8 0 L	. (8 0 L	. (8 0 L	. (8 0 L

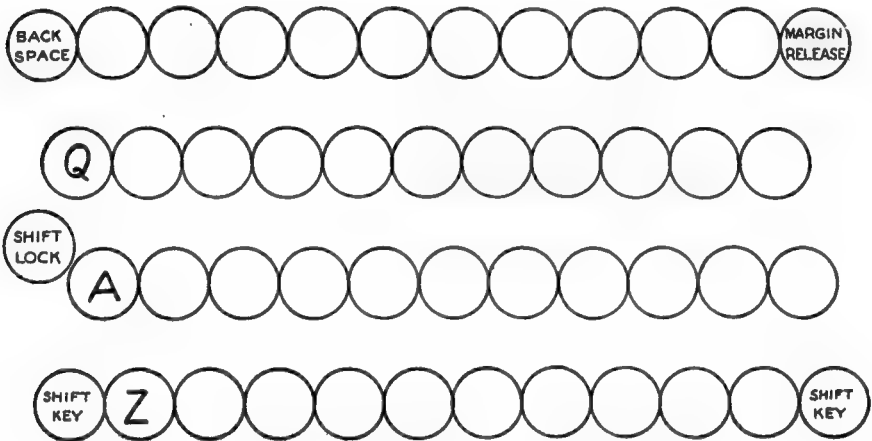
- (12) Concentrate upon the sound of the characters in exercise 11 while smartly tapping the third finger of your right hand upon the table top as each character is recognized.

Review the exercises, take particular note of the sequence of operations and the progress made. Thoroughly review any exercise which you do not fully understand or are unable to perform with ease and precision.

CHARACTER GROUP PRACTICE A-9



Method of printing characters.



Keyboard position of characters.

- (1) Repeat three times, slowly and distinctly, the following character sounds:

DAHDAH DITDIT DAHDAH DITDIT DAHDAH DITDIT
 DAHDAH DITDIT DAHDAH DITDIT DITDAH DITDAH DITDAH
 DITDAH DITDAH DAHDAH DITDAH DAHDAH DITDAH
 DAHDAH DITDAH DAHDAH DITDAH DAHDAH DITDAH
 DAHDAH DITDIT DAHDAH DITDIT DITDAH DITDAH
 DAHDAH DITDAH DAHDAH DITDAH DAHDAH DITDIT DITDAH
 DAHDAH DITDAH DAHDAH DITDIT DITDAH DAHDAH DITDAH

- (2) Print five lines of the letter "Z" while repeating slowly and distinctly the character sound DAHDAH DITDIT:

ZZZ
ZZ
ZZ
ZZ
ZZ

- (3) Print five lines of the letter "A" while repeating slowly and distinctly the character sound DITDAH:

AAAAAAAAAAAAAAAAAA AAAAAAAAAAAAAAAAAA AAAAAAAAAAAAAAAAAA
 AAAAAAAAAAAAAAAAAA AAAAAAAAAAAAAAAAAA AAAAAAAAAAAAAAAAAA
 AAAAAAAAAAAAAAAAAA AAAAAAAAAAAAAAAAAA AAAAAAAAAAAAAAAAAA
 AAAAAAAAAAAAAAAAAA AAAAAAAAAAAAAAAAAA AAAAAAAAAAAAAAAAAA
 AAAAAAAAAAAAAAAAAA AAAAAAAAAAAAAAAAAA AAAAAAAAAAAAAAAAAA

- (4) Print five lines of the letter “Q” while repeating slowly and distinctly the character sound DAHDAH DITDAH:

[illegible]

- (5) Study the keyboard of the group characters and memorize their relative position. Note that the characters are typed with the fourth finger of the left hand and that no shifting of the typewriter carriage is necessary for this particular group.
- (6) Place your right hand flat upon the table top and smartly tap the fourth finger of your left hand upon the table while slowly and distinctly repeating the following exercise: (Perform this exercise at least four times)

DAHDAHDITDAH DAHDAHDITDAH DAHDAHDITDAH
DAHDAHDITDAH DAHDAHDITDAH DITDAH DITDAH DITDAH
DITDAH DITDAH DAHDAHDITDIT DAHDAHDITDIT
DAHDAHDITDIT DAHDAHDITDIT DAHDAHDITDIT

DAHDAH DITDAH DAHDAH DITDAH DITDAH DITDAH
 DAHDAH DITDIT DAHDAH DITDIT DAHDAH DITDAH DITDAH
 DAHDAH DITDIT DAHDAH DITDAH DITDAH DAHDAH DITDIT

- (7) Place your right hand flat upon the table top and smartly tap the fourth finger of your left hand upon the table while slowly and distinctly repeating the character sounds of the following exercise: (Perform this exercise at least four times)

Z A Q	Z A Q	Z A Q	Z A Q	Z A Q
A Q Z	A Q Z	A Q Z	A Q Z	A Q Z
Q Z A	Q Z A	Q Z A	Q Z A	Q Z A

- (8) Repeat slowly and distinctly the following character sounds while printing the characters. Do not crowd the printing, make the characters small, neat and legible, concentrate upon the character sound and the direction and order of pencil movement:

DAHDAH DITDIT DITDAH DAHDAH DITDAH DITDAH
 DAHDAH DITDAH DAHDAH DITDIT DAHDAH DITDAH
 DAHDAH DITDIT DITDAH DAHDAH DITDAH DITDAH
 DAHDAH DITDAH DAHDAH DITDIT DITDAH DAHDAH DITDAH







- (9) Concentrate upon the sound of the characters in the following exercise while printing the characters. Do not crowd the printing, make the characters small, neat and legible:

Q A Z	Q A Z	Q A Z	Q A Z	Q A Z
A Z Q	A Z Q	A Z Q	A Z Q	A Z Q
Z Q A	Z Q A	Z Q A	Z Q A	Z Q A

- (10) Concentrate upon the sound of the characters in exercise 9 while smartly tapping the fourth finger of your left hand upon the table top as each character is recognized.

Review the exercises, take particular note of the sequence of operations and the progress made. Thoroughly review any exercise which you do not fully understand or are unable to perform with ease and precision.

CHARACTER GROUP PRACTICE A-10

FRACTION BAR- 	
QUESTION MARK- 	
COLON- 	
	
PARENTHESIS- 	

Method of printing characters.

- (1) Repeat three times, slowly and distinctly, the following character sounds:

DAHDITDITDAHDIT DAHDITDITDAHDIT DAHDITDITDAHDIT
 DAHDITDITDAHDIT DAHDITDITDAHDIT
 DITDITDAHDAHDITDIT DITDITDAHDAHDITDIT

DITDITDAHDAHDITDIT DITDITDAHDAHDAHDITDIT
DITDITDAHDAHDITDIT DAHDAHDAHDITDITDIT
DAHDAHDAHDITDITDIT DAHDAHDAHDITDITDIT
DAHDAHDAHDITDITDIT DAHDAHDAHDITDITDIT
DITDAHDAHDIT DITDAHDAHDIT DITDAHDAHDIT
DITDAHDAHDIT DITDAHDAHDIT DAHDAHDAHDAHDIT
DAHDAHDAHDAHDIT DAHDAHDAHDAHDIT DAHDAHDAHDAHDIT
DAHDAHDAHDAHDIT DAHDITDAHDAHDITDAH
DAHDIITDAHDAHDITDAH DAHDITDAHDAHDITDAH
DAHDIITDAHDAHDITDAH DAHDITDAHDAHDITDAH
DAHDIITDITDAHDIT DAHDITDITDAHDIT
DITDITDAHDAHDITDIT DITDITDAHDAHDITDIT
DAHDAHDAHDITDITDIT DAHDAHDAHDITDITDIT
DITDAHDAHDIT DITDAHDAHDIT DAHDAHDAHDAHDIT
DAHDAHDAHDAHDIT DAHDITDAHDAHDITDAH
DAHDIITDAHDAHDITDAH DAHDITDITDAHDIT
DITDITDAHDAHDITDIT DAHDAHDAHDITDITDIT
DITDAHDAHDIT DAHDAHDAHDAHDIT DAHDITDAHDAHDITDAH
DAHDIITDITDAHDIT DITDITDAHDAHDITDIT
DAHDAHDAHDITDITDIT DITDAHDAHDIT
DAHDAHDAHDAHDIT DAHDITDAHDAHDITDAH

- (6) Print five lines of the numeral "9" while repeating slowly and distinctly the character sound DAHDAHDAHDIT:

[illegible]

- (7) Print three lines of the International punctuation “)” (parenthesis) while repeating slowly and distinctly the character sound DAHDITDAHDAHDITDAH:

))
))
))

- (8) Study the keyboard of the group characters and memorize their relative position. Note that the characters are typed with the fourth finger of the right hand and that shifting of the typewriter carriage is only necessary when typing the International punctuations “?” (question mark) and “)” (parenthesis).
- (9) Place your left hand flat upon the table top and smartly tap the fourth finger of your right hand upon the table while slowly and distinctly repeating the following exercise: (perform this exercise at least four times)

DAHDITDAHDAHDITDAH DAHDITDAHDAHDITDAH
DAHDITDAHDAHDITDAH DAHDITDAHDAHDITDAH
DAHDITDAHDAHDITDAH DAHDAHDAHDAHDIT
DAHDAHDAHDAHDIT DAHDAHDAHDAHDIT DAHDAHDAHDAHDIT
DAHDAHDAHDAHDIT DITDAHDAHDIT DITDAHDAHDIT
DITDAHDAHDIT DITDAHDAHDIT DITDAHDAHDIT
DAHDAHDAHDITDITDIT DAHDAHDAHDITDITDIT
DAHDAHDAHDITDITDIT DAHDAHDAHDITDITDIT
DAHDAHDAHDITDITDIT DITDITDAHDAHDITDIT
DITDITDAHDAHDITDIT DITDITDAHDAHDITDIT
DITDITDAHDAHDITDIT DITDITDAHDAHDITDIT
DAHDAHDAHDITDITDIT DAHDITDITDAHDIT DAHDITDITDAHDIT

DAHDITDITDAHDIT DAHDITDITDAHDIT
 DAHDITDAHDAHDITDAH DAHDITDAHDAHDITDAH
 DAHDAHDAHDAHDIT DAHDAHDAHDAHDIT DITDAHDAHDIT
 DITDAHDAHDIT DAHDAHDAHDITDITDIT
 DAHDAHDAHDITDITDIT DITDITDAHDAHDITDIT
 DITDITDAHDAHDITDIT DAHDITDITDAHDIT
 DAHDITDITDAHDIT DAHDITDAHDAHDITDAH
 DAHDAHDAHDAHDIT DITDAHDAHDIT DAHDAHDAHDITDITDIT
 DITDITDAHDAHDITDIT DAHDITDITDAHDIT
 DAHDITDAHDAHDITDAH DAHDAHDAHDAHDIT DITDAHDAHDIT
 DAHDAHDAHDITDITDIT DITDITDAHDAHDITDIT
 DAHDITDITDAHDIT

- (10) Place your left hand flat upon the table top and smartly tap the fourth finger of your right hand upon the table while slowly and distinctly repeating the character sounds of the following exercise: (perform this exercise at least four times)

/ ? : P 9)	/ ? : P 9)	/ ? : P 9)
? : P 9) /	? : P 9) /	? : P 9) /
: P 9) / ?	: P 9) / ?	: P 9) / ?
P 9) / ? :	P 9) / ? :	P 9) / ? :
9) / ? : P	9) / ? : P	9) / ? : P
) / ? : P 9	) / ? : P 9	) / ? : P 9

- (11) Repeat slowly and distinctly the following character sounds while printing the characters for which they stand. Do not crowd the printing, make the characters small, neat and legible, concentrate upon the character sound and the direction and order of pencil movement:

DAHDITDITDAHDIT DITDITDAHDAHDITDIT
 DAHDAHDAHDITDITDIT DITDAHDAHDIT DAHDAHDAHDAHDIT
 DAHDITDAHDAHDITDAH DITDITDAHDAHDITDIT
 DAHDAHDAHDITDITDIT DITDAHDAHDIT DAHDAHDAHDAHDIT
 DAHDITDITDAHDIT DAHDAHDAHDITDITDIT DITDAHDAHDIT
 DAHDAHDAHDAHDIT DAHDITDITDAHDIT
 DITDITDAHDAHDITDIT DITDAHDAHDIT DAHDAHDAHDAHDIT

DAHDITDAHDAHDITDAH DAHDITDITDAHDIT
 DITDITDAHDAHDITDIT DAHDAHDAHDITDITDIT
 DITDAHDAHDIT DAHDAHDAHDAHDIT DAHDITDAHDAHDITDAH
 DITDITDAHDAHDITDIT DAHDAHDAHDITDITDIT
 DITDAHDAHDIT DAHDAHDAHDAHDIT DAHDITDITDAHDIT
 DITDITDAHDAHDITDIT DAHDAHDAHDITDITDIT
 DITDAHDAHDIT DAHDAHDAHDAHDIT DAHDITDAHDAHDITDAH

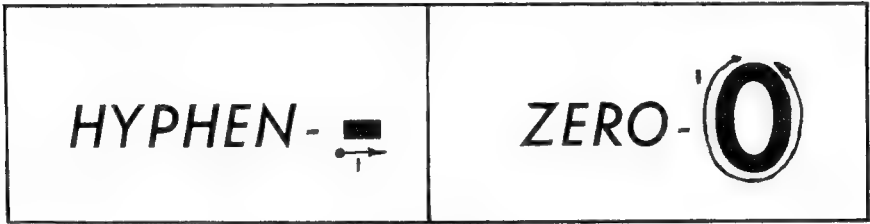
- (12) Concentrate upon the sound of the characters in the following exercise while printing the characters. Do not crowd the printing, make the characters small, neat and legible.

) 9 P : ? /	) 9 P : ? /	) 9 P : ? /
9 P : ? /)	9 P : ? /)	9 P : ? /)
P : ? /) 9	P : ? /) 9	P : ? /) 9
: ? /) 9 P	: ? /) 9 P	: ? /) 9 P
? /) 9 P :	? /) 9 P :	? /) 9 P :

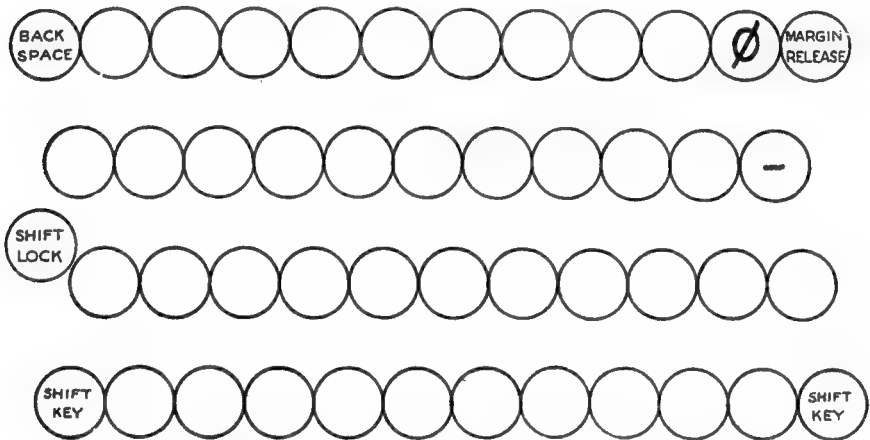
- (13) Concentrate upon the sound of the characters in exercise 11 while smartly tapping the fourth finger of your right hand upon the table top as each character is recognized.

Review the exercises, take particular note of the sequence of operations and the progress made. Thoroughly review any exercise which you do not fully understand or are unable to perform with ease and precision.

CHARACTER GROUP PRACTICE A-11



Method of printing characters.



Keyboard position of characters.

- (1) Repeat three times, slowly and distinctly, the following character sounds:

DAHDITDITDITDITDAH DAHDITDITDITDITDAH
 DAHDITDITDITDITDAH DAHDITDITDITDITDAH
 DAHDITDITDITDITDAH DAHDAHDAHDAHDAH
 DAHDAHDAHDAHDAH DAHDAHDAHDAHDAH DAHDAHDAHDAHDAH
 DAHDAHDAHDAHDAH DAHDITDITDITDITDAH
 DAHDITDITDITDITDAH DAHDAHDAHDAHDAH
 DAHDAHDAHDAHDAH DAHDITDITDITDITDAH
 DAHDAHDAHDAHDAH DAHDITDITDITDITDAH
 DAHDAHDAHDAHDAH

- (2) Print five lines of the International punctuation “-” (hyphen or dash used as point of separation) while repeating slowly and distinctly the character sound DAHDITDITDITDAH:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

- (3) Print five lines of the numeral “0” (zero) while repeating slowly and distinctly the character sound DAHDAHDAHDAH:

[illegible]

- (4) Study the keyboard of the group characters and memorize their relative position. Note that the characters are typed with the fourth finger of the right hand and that no shifting of the typewriter carriage is necessary for this particular group.
- (5) Place your left hand flat upon the table top and smartly tap the fourth finger of your right hand upon the table while slowly and distinctly repeating the following exercise: (perform this exercise at least four times)

DAHDAHDAHDAHDAH DAHDAHDAHDAHDAH DAHDAHDAHDAHDAH
DAHDAHDAHDAHDAH DAHDAHDAHDAHDAH
DAHDIITDITDITDITDAH DAHDIITDITDITDITDAH
DAHDIITDITDITDITDAH DAHDIITDITDITDITDAH
DAHDIITDITDITDITDAH DAHDAHDAHDAHDAH
DAHDAHDAHDAHDAH DAHDIITDITDITDITDAH
DAHDIITDITDITDITDAH DAHDAHDAHDAHDAH
DAHDIITDITDITDITDAH DAHDAHDAHDAHDAH
DAHDIITDITDITDITDAH

- (6) Place your left hand flat upon the table top and smartly tap the fourth finger of your right hand upon the table while slowly and

distinctly repeating the character sounds of the following exercise: (perform this exercise at least four times)

- Ø Ø	- Ø Ø	- Ø Ø	- Ø Ø	- Ø Ø	- Ø Ø
Ø - Ø	Ø - Ø	Ø - Ø	Ø - Ø	Ø - Ø	Ø - Ø
Ø Ø -	Ø Ø -	Ø Ø -	Ø Ø -	Ø Ø -	Ø Ø -

- (7) Repeat slowly and distinctly the following character sounds while printing the characters for which they stand. Do not crowd the printing, make the characters small, neat and legible, concentrate upon the character sound and the direction and order of pencil movement:

DAHDITDITDITDAH DAHDAHDAHDAH
 DAHDAHDAHDAH DAHDAHDAHDAH
 DAHDITDITDITDAH DAHDITDITDITDAH
 DAHDAHDAHDAH DAHDITDITDITDAH
 DAHDITDITDITDAH DAHDAHDAHDAH
 DAHDITDITDITDAH DAHDAHDAHDAH
 DAHDITDITDITDAH DAHDITDITDITDAH

- (8) Concentrate upon the sound of the characters in the following exercise while printing the characters. Do not crowd the printing, make the characters small, neat and legible:

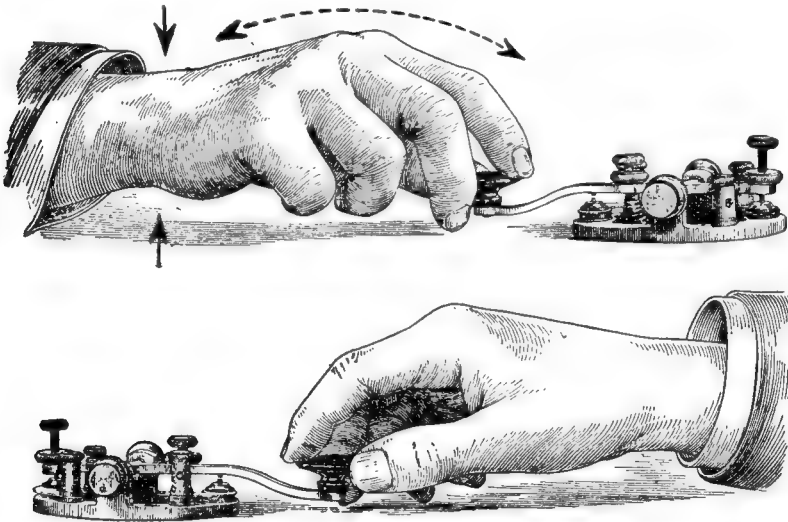
Ø - -	Ø - -	Ø - -	Ø - -	Ø - -	Ø - -
- Ø -	- Ø -	- Ø -	- Ø -	- Ø -	- Ø -
- - Ø	- - Ø	- - Ø	- - Ø	- - Ø	- - Ø

- (9) Concentrate upon the sound of the characters in exercise 8 while smartly tapping the fourth finger of your right hand upon the table top as each character is recognized.

Review the exercises, take particular note of the sequence of operations and the progress made. Thoroughly review any exercise which you do not fully understand or are unable to perform with ease and precision.

KEY MANIPULATION

No hard and fast rule can be established for grasping and manipulating a telegraph key. Every operator develops a distinct "touch" of the key knob and a definite "rocking" of the wrist and forearm in manipulating the key lever. The primary consideration in developing proper key manipulation is the adjustment of the key spring tension and the adjustment of the key contact spacing. Until a definite "key feel" has been developed a spring tension of approximately $\frac{3}{4}$ th pound with a contact spacing of approximately $\frac{3}{64}$ th inch may be considered satisfactory. The spring may be adjusted by loosening the spring adjustment until a weight of approximately $\frac{3}{4}$ th pound is sufficient to close the contacts when placed upon the surface of the key knob. The space may be adjusted by tightening the space adjustment until a space of approximately $\frac{3}{64}$ th inch exists between the key contact points. As accuracy and speed of key manipulation is attained the tension and space may be reduced to an absolute minimum.



Position of the hand in manipulating a telegraph key

The key should be placed approximately 18 inches from the edge of the operating table and directly in front of the operator. The key should be securely attached to the operating table which must be of solid substantial construction, approximately 30 inches high. If it is impracticable to fasten the key permanently to the operating table it may be mounted on a thin wood or metal disc, which in turn is

maintained in a definite position by an adequate weight, such as a flat iron. Under no circumstances should the key be permitted to "slide," "twist," or "skid" on the operating table. It must be solidly affixed to the table with the base of the key and the top of the table forming an inseparable unit.

The key lever is actuated by a "rocking" motion of the wrist and forearm which closes the contact points by flexure of the muscles of the wrist and forearm as the characters are formed. Under no circumstances may the muscles of the fingers or thumb be permitted to assist in actuating the key level. The finger and thumb muscles should be relaxed, with the digets resting on the key knob in a comfortable position. It is imperative that the thumb and fingers be forced to assume a normal position of ease and relaxation. This position must be assumed each time the key is operated during a practice period or later on as an accomplished operator. Form the habit of grasping the key knob in a particular manner, and continue to cultivate the manner. A study of the illustration will reveal a "normal key grasp" which may well be cultivated.

The manipulation of the telegraph key results in the formation of code characters which must be accurately spaced, of proper time intervals, and semi-automatic in accomplishment. Preliminary key manipulation resolves into the fundamental wrist and forearm motion of "rocking" the wrist and forearm while the fingers and thumb remain stationary atop the key knob.

PRELIMINARY TRANSMITTING PRACTICE

This section is devoted to the study and manipulation of the telegraph key in transmitting characters composed of dits and dahs either singularly or in combination with other characters. In certain instances the combinations of dits and dahs have definite meanings while in others the combinations are meaningless. Pay no attention to the meaning or lack of meaning of the combinations, merely practice the key manipulation.

Grasp the key as outlined in the preceding section, sit comfortably at the table, with the body erect, the right arm extended straight forward to the key knob and the left hand flat upon the table top. (Left-handed individuals reverse the position of the hands.)

Repeat the following character sounds while manipulating the telegraph key. The key should be depressed for a short interval during the dits and an interval three times as long for the dahs. The time interval between the various dits and dahs should be equal to the time interval of the individual dits.

- (1) Transmit each line five times before proceeding to the following line :

DITDITDITDITDITDITDITDITDIT
 DAHDAHDAHDAHDAHDAHDAHDAHDAH
 DITDITDAHDIITDAHDIITDAHDIITDAH
 DITDITDITDAHDIITDITDITDAHDIITDAH
 DITDITDITDITDAHDIITDITDITDITDAH
 DITDITDAHDAHDIITDITDAHDAHDIITDAH
 DITDAHDIITDITDAHDAHDIITDAHDIITDAH
 DITDAHDAHDAHDIITDITDAHDAHDAHDIT
 DITDITDAHDIITDITDITDAHDIITDIT
 DITDAHDIITDAHDIITDITDAHDIITDAHDIIT
 DITDAHDIITDAHDIITDAHDIITDAHDIITDAH
 DAHDITDAHDIITDAHDIITDAHDIITDAHDIIT
 DAHDAHDIITDAHDAHDIITDAHDAHDAHDIT
 DAHDAHDAHDAHDITDAHDAHDAHDAHDIT
 DAHDAHDAHDAHDIITDAHDAHDAHDAHDIT
 DAHDAHDIITDITDAHDAHDIITDITDAHDAHDIITDIT
 DAHDITDITDITDAHDAHDIITDITDITDAH
 DAHDAHDIITDAHDAHDAHDAHDIITDAHDAH
 DAHDITDAHDIITDAHDAHDAHDIITDAHDIITDAH

- (2) Transmit each line ten times before proceeding to the following line.

DITDAHDIITDAH DITDAHDIITDAH DITDAHDIITDAH
 DAHDAHDIITDAHDAH DAHDAHDIITDAHDAH DAHDAHDIITDAHDAH
 DITDAHDIITDAH DITDAHDIITDAH DITDAHDIITDAH
 DAHDAHDAHDIIT DAHDAHDAHDIIT DAHDAHDAHDIIT
 DAHDAHDAHDAH DAHDAHDAHDAH DAHDAHDAHDAH
 DAHDAHDIITDAHDAH DAHDAHDIITDAHDAH DAHDAHDIITDAHDAH
 DITDITDAHDIITDIT DITDITDAHDIITDIT DITDITDAHDIITDIT
 DITDITDAHDIITDAH DITDITDAHDIITDAH DITDITDAHDIITDAH
 DITDITDAHDAH DITDITDAHDAH DITDITDAHDAH

DAHDAHDAHDAH DAHDAHDAHDAH DAHDAHDAHDAH
 DAHDAHDAHDIH DAHDAHDAHDIH DAHDAHDAHDIH
 DITDAHDIHDAH DITDAHDIHDAH DITDAHDIHDAH
 DAHDAHDAHDAH DAHDAHDAHDAH DAHDAHDAHDAH
 DITDAHDAHDIHDAH DITDAHDAHDIHDAH DITDAHDAHDIHDAH
 DAHDAHDIHDAHDAH DAHDAHDIHDAHDAH DAHDAHDIHDAHDAH
 DITDITDAHDIHDIH DITDITDAHDIHDIH DITDITDAHDIHDIH
 DAHDAHDAHDIH DAHDAHDAHDIH DAHDAHDAHDIH
 DITDITDAHDAH DITDITDAHDAH DITDITDAHDAH
 DITDAHDIHDAH DAHDAHDAHDAH DITDAHDAHDIHDAH
 DAHDAHDIHDAHDAH DITDITDAHDIHDIH DAHDAHDAHDIH
 DITDITDAHDAH DITDAHDIHDAH DITDAHDIHDAH
 DAHDAHDAHDAH DAHDAHDAHDAH DITDITDAHDAHDIHDAH
 DITDITDAHDAHDIHDAH DAHDAHDIHDAHDAH
 DAHDAHDIHDAHDAH DAHDAHDAHDIH DAHDAHDAHDIH
 DITDITDAHDAH DITDITDAHDAH DITDAHDIHDAH
 DAHDAHDAHDAH DITDAHDAHDIHDAH DAHDAHDIHDAHDAH
 DITDITDAHDIHDIH DAHDAHDAHDIH DITDITDAHDAH

- (3) Obtain the assistance of a second person to read each line of the above exercises while you transmit the character sounds. Concentrate on the similarity of the individual dits and dahs with the short and long sounds of the practice set.

TRANSMITTING GROUP PRACTICE B-1

- (1) Transmit slowly and distinctly the following character sounds while concentrating upon the characters for which they stand:

DAHDITDITDIT DAHDITDITDIT DAHDITDITDIT
 DAHDITDITDIT DAHDITDITDIT DAHDAHDIT DAHDAHDIT
 DAHDAHDIT DAHDAHDIT DAHDAHDIT DAH DAH DAH DAH
 DAH DITDITDITDITDAH DITDITDITDITDAH
 DITDITDITDITDAH DITDITDITDITDAH DITDITDITDITDAH
 DAHDITDITDIT DAHDITDITDIT DAHDAHDIT DAHDAHDIT
 DAH DAH DITDITDITDITDAH DITDITDITDITDAH
 DAHDITDITDIT DAHDAHDIT DAH DITDITDITDITDAH
 DAHDITDITDIT DAHDAHDIT DAH DITDITDITDITDAH
 DITDITDITDITDAH DITDITDITDITDAH DITDITDITDITDAH
 DITDITDITDITDAH DITDITDITDITDAH DAH DAH DAH DAH
 DAH DAHDAHDIT DAHDAHDIT DAHDAHDIT DAHDAHDIT
 DAHDAHDIT DAHDITDITDIT DAHDITDITDIT
 DAHDITDITDIT DAHDITDITDIT DAHDITDITDIT
 DITDITDITDITDAH DITDITDITDITDAH DAH DAH
 DAHDAHDIT DAHDAHDIT DAHDITDITDIT DAHDITDITDIT
 DITDITDITDITDAH DAH DAHDAHDIT DAHDITDITDIT
 DITDITDITDITDAH DAH DAHDAHDIT DAHDITDITDIT
 DAHDITDITDIT DAHDAHDIT DAH DITDITDITDITDAH
 DAHDAHDIT DAH DITDITDITDITDAH DAHDITDITDIT
 DAH DITDITDITDITDAH DAHDITDITDIT DAHDAHDIT
 DITDITDITDITDAH DAHDITDITDIT DAHDAHDIT DAH

- (2) Transmit slowly and distinctly the following character sounds while concentrating upon the characters for which they stand:

DAHDIT DAHDIT DAHDIT DAHDIT DAHDIT DITDITDITDIT
 DITDITDITDIT DITDITDITDIT DITDITDITDIT
 DITDITDITDIT DAHDITDAHDAH DAHDITDAHDAH

DAHDITDAHDAH DAHDITDAHDAH DAHDITDAHDAH
 DITDITDITDITDIT DITDITDITDITDIT DITDITDITDITDIT
 DITDITDITDITDIT DITDITDITDITDIT
 DITDITDAHDAHDAHDITDAH DITDITDAHDAHDAHDITDAH
 DITDITDAHDAHDAHDITDAH DITDITDAHDAHDAHDITDAH
 DITDITDAHDAHDAHDITDAH DAHDIT DAHDIT DITDITDITDIT
 DITDITDITDIT DAHDITDAHDAH DAHDITDAHDAH
 DITDITDITDITDIT DITDITDITDITDIT
 DITDITDAHDAHDAHDITDAH DITDITDAHDAHDAHDITDAH DAHDIT
 DITDITDITDIT DAHDITDAHDAH DITDITDITDITDIT
 DITDITDAHDAHDAHDITDAH DAHDIT DITDITDITDIT
 DAHDITDAHDAH DITDITDITDITDIT DITDITDAHDAHDAHDITDAH
 DITDITDAHDAHDAHDITDAH DITDITDAHDAHDAHDITDAH
 DITDITDAHDAHDAHDITDAH DITDITDAHDAHDAHDITDAH
 DITDITDAHDAHDAHDITDAH DITDITDITDITDIT
 DITDITDITDITDIT DITDITDITDITDIT DITDITDITDITDIT
 DITDITDITDITDIT DAHDITDAHDAH DAHDITDAHDAH
 DAHDITDAHDAH DAHDITDAHDAH DAHDITDAHDAH
 DITDITDITDIT DITDITDITDIT DITDITDITDIT
 DITDITDITDIT DITDITDITDIT DAHDIT DAHDIT DAHDIT
 DAHDIT DAHDIT DITDITDAHDAHDAHDITDAH
 DITDITDITDITDIT DAHDITDAHDAH DITDITDITDIT
 DAHDIT DITDITDAHDAHDAHDITDAH DITDITDITDITDIT
 DAHDITDAHDAH DITDITDITDIT DAHDIT
 DAHDIT DITDITDITDIT DAHDITDAHDAH
 DITDITDITDITDIT DITDITDAHDAHDAHDITDAH DITDITDITDIT
 DAHDITDAHDAH DITDITDITDITDIT DITDITDAHDAHDAHDITDAH
 DAHDIT DAHDITDAHDAH DITDITDITDITDIT
 DITDITDAHDAHDAHDITDAH DAHDIT DITDITDITDIT
 DITDITDITDITDIT DITDITDAHDAHDAHDITDAH DAHDIT
 DITDITDITDIT DAHDITDAHDAH DITDITDAHDAHDAHDITDAH
 DAHDIT DITDITDITDIT DAHDITDAHDAH
 DITDITDITDITDIT DAHDIT DITDITDITDIT DAHDITDAHDAH
 DITDITDITDITDIT DITDITDAHDAHDAHDITDAH
 DITDITDITDIT DAHDITDAHDAH

DITDITDITDITDIT DITDITDAHDAHDITDAH DAHDIT
 DAHDITDAHDAH DITDITDITDITDIT DITDITDAHDAHDITDAH
 DAHDIT DITDITDITDIT DAHDITDAHDAH
 DITDITDAHDAHDITDAH DAHDIT DITDITDITDIT
 DAHDITDAHDAH DITDITDITDITDIT DITDITDAHDAHDITDAH

- (3) Transmit slowly and distinctly the following character sounds while concentrating upon the characters for which they stand:

DITDITDITDAH DITDITDITDAH DITDITDITDAH
 DITDITDITDAH DITDITDITDAH DITDITDAHDIT
 DITDITDAHDIT DITDITDAHDIT DITDITDAHDIT
 DITDITDAHDIT DITDAHDIT DITDAHDIT DITDAHDIT
 DITDAHDIT DITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDAH DITDITDITDAHDAH
 DITDITDITDAHDAH DITDITDITDAHDAH
 DITDITDITDAHDITDITDAH DITDITDITDAHDITDITDAH
 DITDITDITDAHDITDITDAH DITDITDITDAHDITDITDAH
 DITDITDITDAHDITDITDAH DITDITDITDAH
 DITDITDITDAH DITDITDAHDIT DITDITDAHDIT
 DITDAHDIT DITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDAH DITDITDITDAHDITDITDAH
 DITDITDITDAHDITDITDAH DITDITDITDAH DITDITDAHDIT
 DITDAHDIT DITDITDITDAHDAH DITDITDITDAHDITDITDAH
 DITDITDITDAH DITDITDAHDIT DITDAHDIT
 DITDITDITDAHDAH DITDITDITDAHDITDITDAH
 DITDITDITDAHDITDITDAH DITDITDITDAHDITDITDAH
 DITDITDITDAHDITDITDAH DITDITDITDAHDAH
 DITDITDITDAHDAH DITDAHDIT DITDAHDIT DITDAHDIT
 DITDAHDIT DITDAHDIT DITDITDAHDIT DITDITDAHDIT
 DITDITDAHDIT DITDITDAHDIT DITDITDAHDIT
 DITDITDITDAH DITDITDITDAH DITDITDITDAH
 DITDITDITDAH DITDITDITDAH DITDITDITDAHDITDITDAH
 DITDITDITDAHDITDITDAH DITDITDITDAHDAH

DITDITDITDAHDAH DITDAHDIT DITDAHDIT
 DITDITDAHDIT DITDITDAHDIT DITDITDITDAH
 DITDITDITDAH DITDITDITDAHDITDITDAH
 DITDITDITDAHDAH DITDAHDIT DITDITDAHDIT
 DITDITDITDAH DITDITDITDAHDITDITDAH
 DITDITDITDAHDAH DITDAHDIT DITDITDAHDIT
 DITDITDITDAH DITDITDAHDIT DITDAHDIT
 DITDITDITDAHDAH DITDITDITDAHDITDITDAH
 DITDITDAHDIT DITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDITDITDAH DITDITDITDAH DITDITDAHDIT
 DITDAHDIT DITDITDITDAHDITDITDAH DITDITDITDAH
 DITDITDAHDIT DITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDITDITDAH DITDITDITDAH DITDITDAHDIT
 DITDAHDIT DITDITDITDAHDAH DITDITDITDAHDITDITDAH
 DITDITDAHDIT DITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDITDITDAH DITDITDITDAH DITDITDAHDIT
 DITDAHDIT DITDITDITDAHDITDITDAH DITDITDITDAH
 DITDITDAHDIT DITDAHDIT DITDITDITDAHDAH
 DITDITDITDAHDITDITDAH

- (4) Transmit slowly and distinctly the following character sounds while concentrating upon the characters for which they stand:

DAHDAH DAHDAH DAHDAH DAHDAH DAHDAH DITDAHDAHDAH
 DITDAHDAHDAH DITDAHDAHDAH DITDAHDAHDAH
 DITDAHDAHDAH DITDITDAH DITDITDAH DITDITDAH
 DITDITDAH DITDITDAH DAHDITDITDITDIT
 DAHDITDITDITDIT DAHDITDITDITDIT DAHDITDITDITDIT
 DAHDITDITDITDIT DAHDAH DAHDAH DITDAHDAHDAH

DITDAHDAHDAH DITDITDAH DITDITDAH
 DAHDITDITDITDIT DAHDITDITDITDIT DAHDAH
 DITDAHDAHDAH DITDITDAH DAHDITDITDITDIT DAHDAH
 DITDAHDAHDAH DITDITDAH DAHDITDITDITDIT
 DAHDITDITDITDIT DAHDITDITDITDIT DAHDITDITDITDIT
 DAHDITDITDITDIT DAHDITDITDITDIT DITDITDAH
 DITDITDAH DITDITDAH DITDITDAH DITDITDAH
 DITDAHDAHDAH DITDAHDAHDAH DITDAHDAHDAH
 DITDAHDAHDAH DITDAHDAHDAH DAHDAH DAHDAH DAHDAH
 DAHDAH DAHDAH DAHDITDITDITDIT DAHDITDITDITDIT
 DITDITDAH DITDITDAH DITDAHDAHDAH DITDAHDAHDAH
 DAHDAH DAHDAH DAHDITDITDITDIT DITDITDAH
 DITDAHDAHDAH DAHDAH DAHDITDITDITDIT DITDITDAH
 DITDAHDAHDAH DAHDAH DAHDAH DITDAHDAHDAH
 DAHDAH DITDAHDAHDAH DITDITDAH DAHDITDITDITDIT
 DITDAHDAHDAH DITDITDAH DAHDITDITDITDIT DAHDAH
 DITDITDAH DAHDITDITDITDIT DAHDAH DITDAHDAHDAH
 DAHDITDITDITDIT DAHDAH DITDAHDAHDAH DITDITDAH

- (5) Transmit slowly and distinctly the following character sounds while concentrating upon the characters for which they stand:

DAHDITDAHDIT DAHDITDAHDIT DAHDITDAHDIT
 DAHDITDAHDIT DAHDITDAHDIT DAHDITDIT DAHDITDIT
 DAHDITDIT DAHDITDIT DAHDITDIT DIT DIT DIT DIT
 DIT DITDITDAHDAHDAH DITDITDAHDAHDAH
 DITDITDAHDAHDAH DITDITDAHDAHDAH DITDITDAHDAHDAH
 DAHDITDAHDIT DAHDITDAHDIT DAHDITDIT DAHDITDIT
 DIT DIT DITDITDAHDAHDAH DITDITDAHDAHDAH
 DAHDITDAHDIT DAHDITDIT DIT DITDITDAHDAHDAH
 DAHDITDAHDIT DAHDITDIT DIT DITDITDAHDAHDAH
 DITDITDAHDAHDAH DITDITDAHDAHDAH DITDITDAHDAHDAH

DITDITDAHDAHDAH DITDITDAHDAHDAH DIT DIT DIT DIT
 DIT DAHDITDIT DAHDITDIT DAHDITDIT DAHDITDIT
 DAHDITDIT DAHDITDAHDIT DAHDITDAHDIT
 DAHDITDAHDIT DAHDITDAHDIT DAHDITDAHDIT
 DITDITDAHDAHDAH DITDITDAHDAHDAH DIT DIT
 DAHDITDIT DAHDITDIT DAHDITDAHDIT DAHDITDAHDIT
 DITDITDAHDAHDAH DIT DAHDITDIT DAHDITDAHDIT
 DITDITDAHDAHDAH DIT DAHDITDIT DAHDITDAHDIT
 DAHDITDAHDIT DAHDITDIT DIT DITDITDAHDAHDAH
 DAHDITDIT DIT DITDITDAHDAHDAH DAHDITDAHDIT DIT
 DITDITDAHDAHDAH DAHDITDAHDIT DAHDITDIT
 DITDITDAHDAHDAH DAHDITDAHDIT DAHDITDIT DIT
 DITDITDAHDAHDAH DAHDITDIT DIT DITDITDAHDAHDAH
 DAHDITDAHDIT DIT DITDITDAHDAHDAH DAHDITDAHDIT
 DAHDITDIT DIT DITDITDAHDAHDAH

TRANSMITTING GROUP PRACTICE B-2

- (1) Transmit slowly and distinctly the following character sounds while concentrating upon the characters for which they stand:

DAHDAHDIITDITDAHDAH DAHDAHDIITDITDAHDAH
 DAHDAHDIITDITDAHDAH DAHDAHDIITDITDAHDAH
 DAHDAHDIITDITDAHDAH DAHDITDAH DAHDITDAH
 DAHDITDAH DAHDITDAH DAHDITDAH DITDIT DITDIT
 DITDIT DITDIT DITDIT DAHDAHDIITDITDIT
 DAHDAHDIITDITDIT DAHDAHDIITDITDIT DAHDAHDIITDITDIT
 DAHDAHDIITDITDIT DITDAHDAHDAHDAHDIT
 DITDAHDAHDAHDAHDIT DITDAHDAHDAHDAHDIT
 DITDAHDAHDAHDAHDIT DITDAHDAHDAHDAHDIT
 DAHDAHDIITDITDAHDAH DAHDAHDIITDITDAHDAH
 DAHDITDAH DAHDITDAH DITDIT DITDIT
 DAHDAHDIITDITDIT DAHDAHDIITDITDIT
 DITDAHDAHDAHDAHDIT DITDAHDAHDAHDAHDIT
 DAHDAHDIITDITDAHDAH DAHDITDAH DITDIT
 DAHDAHDIITDITDIT DITDAHDAHDAHDAHDIT
 DAHDAHDIITDITDAHDAH DAHDITDAH DITDIT

DAHDAHDITDITDIT DITDAHDAHDAHDAHDIT
 DITDAHDAHDAHDAHDIT DITDAHDAHDAHDAHDIT
 DITDAHDAHDAHDAHDIT DITDAHDAHDAHDAHDIT
 DITDAHDAHDAHDAHDIT DAHDAHDITDITDIT
 DAHDAHDITDITDIT DAHDAHDITDITDIT DAHDAHDITDITDIT
 DAHDAHDITDITDIT DITDIT DITDIT DITDIT DITDIT
 DITDIT DAHDITDAH DAHDITDAH DAHDITDAH DAHDITDAH
 DAHDITDAH DAHDAHDITDITDAHDAH DAHDAHDITDITDAHDAH
 DAHDAHDITDITDAHDAH DAHDAHDITDITDAHDAH
 DAHDAHDITDITDAHDAH DITDAHDAHDAHDAHDIT
 DITDAHDAHDAHDAHDIT DAHDAHDITDITDIT
 DAHDAHDITDITDIT DITDIT DITDIT DAHDITDAH
 DAHDITDAH DAHDAHDITDITDAHDAH DAHDAHDITDITDAHDAH
 DAHDAHDITDITDAHDAH DAHDITDAH DITDIT
 DAHDAHDITDITDIT DITDAHDAHDAHDAHDIT DAHDITDAH
 DITDIT DAHDAHDITDITDIT DITDAHDAHDAHDAHDIT
 DAHDAHDITDITDAHDAH DITDIT DAHDAHDITDITDIT
 DITDAHDAHDAHDIT DAHDITDAH DAHDAHDITDITDIT
 DITDAHDAHDAHDAHDIT DAHDAHDITDITDAHDAH DAHDITDAH
 DITDIT DITDAHDAHDAHDAHDIT DAHDAHDITDITDAHDAH
 DAHDITDAH DITDIT DAHDAHDITDITDIT
 DITDAHDAHDAHDAHDIT DAHDITDAH DITDIT
 DAHDAHDITDITDIT DITDAHDAHDAHDAHDIT
 DAHDAHDITDITDAHDAH DAHDITDAH DAHDAHDITDITDIT
 DITDAHDAHDAHDAHDIT DAHDAHDITDITDAHDAH DAHDITDAH
 DITDIT DITDAHDAHDAHDAHDIT DAHDAHDITDITDAHDAH
 DAHDITDAH DITDIT DAHDAHDITDITDIT
 DITDAHDAHDAHDAHDIT DITDAHDAHDAHDAHDIT

- (2) Transmit slowly and distinctly the following character sounds while concentrating upon the characters for which they stand:

DAHDITDITDAH DAHDITDITDAH DAHDITDITDAH
 DAHDITDITDAH DAHDITDITDAH DITDITDIT DITDITDIT
 DITDITDIT DITDITDIT DITDITDIT DITDAHDAH
 DITDAHDAH DITDAHDAH DITDAHDAH DITDAHDAH

DITDAHDAHDAHDAH DITDAHDAHDAHDAH DITDAHDAHDAHDAH
 DITDAHDAHDAHDAH DAHDITDITDAH DAHDITDITDAH
 DITDITDIT DITDITDIT DITDAHDAH DITDAHDAH
 DITDAHDAHDAHDAH DITDAHDAHDAHDAH DAHDITDITDAH
 DITDITDIT DITDAHDAH DITDAHDAHDAHDAH
 DAHDITDITDAH DITDITDIT DITDAHDAH
 DITDAHDAHDAHDAH DITDITDIT DITDITDIT DITDAHDAH
 DITDAHDAHDAHDAH DITDAHDAHDAHDAH DITDAHDAHDAHDAH
 DITDAHDAHDAH DITDAHDAH DITDAHDAH DITDAHDAH
 DITDITDIT DITDITDIT DITDITDIT DITDITDIT
 DITDITDIT DAHDITDITDAH DAHDITDITDAH
 DAHDITDITDAH DAHDITDITDAH DAHDITDITDAH
 DITDAHDAHDAHDAH DITDAHDAHDAHDAH DITDAHDAH
 DITDAHDAH DITDITDIT DITDITDIT DAHDITDITDAH
 DAHDITDITDAH DITDAHDAHDAHDAH DITDAHDAH
 DITDITDIT DAHDITDITDAH DITDAHDAHDAHDAH
 DITDAHDAH DITDITDIT DAHDITDITDAH
 DAHDITDITDAH DITDITDIT DITDAHDAH
 DITDAHDAHDAHDAH DITDITDIT DITDAHDAH
 DITDAHDAHDAHDAH DAHDITDITDAH DITDAHDAH
 DITDAHDAHDAHDAH DAHDITDITDAH DITDITDIT
 DITDAHDAHDAHDAH DAHDITDITDAH DITDITDIT
 DITDAHDAH DITDAHDAHDAHDAH DITDAHDAH

- (3) Transmit slowly and distinctly the following character sounds while concentrating upon the characters for which they stand:

DITDAHDITDAHDITDAH DITDAHDITDAHDITDAH
 DITDAHDITDAHDITDAH DITDAHDITDAHDITDAH
 DITDAHDITDAHDITDAH DITDAHDITDIT DITDAHDITDIT
 DITDAHDITDIT DITDAHDITDIT DITDAHDITDIT

DAHDAHDAH DAHDAHDAH DAHDAHDAH DAHDAHDAH
 DAHDAHDAH DAHDAHDAH DITDIT DAHDAHDAH DITDIT
 DAHDAHDAH DITDIT DAHDAHDAH DITDIT DAHDAHDAH DITDIT
 DAHDITDAH DAHDITDAH DAHDITDAH DAHDITDAH
 DAHDITDAH DAHDITDAH DAHDITDAH DAHDITDAH
 DAHDITDAH DAHDITDAH DITDAH DITDAH DITDAH
 DITDAH DITDAH DITDAH DITDAH DITDIT DITDAH DITDIT
 DAHDAHDAH DAHDAHDAH DAHDAHDAH DITDIT
 DAHDAHDAH DITDIT DAHDITDAH DAHDITDAH
 DAHDITDAH DAHDITDAH DITDAH DITDAH DITDAH
 DITDAH DITDIT DAHDAHDAH DAHDAHDAH DITDIT
 DAHDITDAH DAHDITDAH DITDAH DITDAH DITDAH
 DITDAH DITDIT DAHDAHDAH DAHDAHDAH DITDIT
 DAHDITDAH DAHDITDAH DAHDITDAH DAHDITDAH
 DAHDAHDAH DITDIT DAHDAHDAH DITDIT DAHDAHDAH DITDIT
 DAHDAHDAH DITDIT DAHDAHDAH DITDIT DAHDAHDAH
 DAHDAHDAH DAHDAHDAH DAHDAHDAH DAHDAHDAH
 DITDAH DITDIT DITDAH DITDIT DITDAH DITDIT
 DITDAH DITDIT DITDAH DITDIT DITDAH DITDAH DITDAH
 DITDAH DITDAH DITDAH DITDAH DITDAH DITDAH
 DAHDITDAH DAHDITDAH DAHDITDAH DAHDITDAH
 DAHDAHDAH DITDIT DAHDAHDAH DITDIT DAHDAHDAH
 DAHDAHDAH DITDAH DITDAH DITDAH DITDAH
 DAHDITDAH DAHDITDAH DAHDAHDAH DITDIT DAHDAHDAH
 DITDAH DITDIT DITDAH DITDAH DITDAH
 DITDAH DITDAH DITDAH DITDAH DITDAH DAHDAHDAH
 DAHDAHDAH DITDIT DAHDITDAH DAHDITDAH DITDAH DITDIT
 DAHDAHDAH DAHDAHDAH DITDIT DAHDITDAH DAHDITDAH
 DITDAH DITDAH DAHDAHDAH DAHDAHDAH DITDIT
 DAHDITDAH DAHDITDAH DITDAH DITDAH DITDAH
 DITDAH DITDIT DAHDAHDAH DAHDITDAH DAHDITDAH

DITDAHDITDAHDITDAH DITDAHDITDIT DAHDAHDAH
 DAHDAHDAH DITDIT DITDAHDITDAHDITDAH DITDAHDITDIT
 DAHDAHDAH DAHDAHDAH DITDIT DAHDITDAHDAHDITDAH
 DITDAHDITDIT DAHDAHDAH DAHDAHDAH DITDIT
 DAHDITDAHDAHDITDAH DITDAHDITDAHDITDAH DAHDAHDAH
 DAHDAHDAH DITDIT DAHDITDAHDAHDITDAH
 DITDAHDITDAHDITDAH DITDAHDITDIT DAHDAHDAH DITDIT
 DAHDITDAHDAHDITDAH DITDAHDITDAHDITDAH
 DITDAHDITDIT DAHDAHDAH DAHDAHDAH DITDIT
 DAHDITDAHDAHDITDAH DITDAHDITDAHDITDAH
 DITDAHDITDIT DAHDAHDAH DAHDAHDAH DITDIT

- (4) Transmit slowly and distinctly the following character sounds while concentrating upon the characters for which they stand:

DAHDAHDITDIT DAHDAHDITDIT DAHDAHDITDIT
 DAHDAHDITDIT DAHDAHDITDIT DITDAH DITDAH DITDAH
 DITDAH DITDAH DAHDAHDITDAH DAHDAHDITDAH
 DAHDAHDITDAH DAHDAHDITDAH DAHDAHDITDAH
 DAHDAHDITDIT DAHDAHDITDIT DITDAH DITDAH
 DAHDAHDITDAH DAHDAHDITDAH DAHDAHDITDIT DITDAH
 DAHDAHDITDAH DAHDAHDITDIT DITDAH DAHDAHDITDAH
 DAHDITDITDITDITDAH DAHDITDITDITDITDAH
 DAHDITDITDITDITDAH DAHDITDITDITDITDAH
 DAHDITDITDITDITDAH DAHDAHDAHDAHDAH
 DAHDAHDAHDAHDAH DAHDAHDAHDAHDAH DAHDAHDAHDAHDAH
 DAHDAHDAHDAHDAH DAHDITDITDITDITDAH
 DAHDITDITDITDITDAH DAHDAHDAHDAHDAH
 DAHDAHDAHDAHDAH DAHDITDITDITDITDAH
 DAHDAHDAHDAHDAH DAHDITDITDITDITDAH
 DAHDAHDITDAH DAHDAHDITDAH DAHDAHDITDAH
 DAHDAHDITDAH DAHDAHDITDAH DITDAH DITDAH DITDAH
 DITDAH DITDAH DAHDAHDITDIT DAHDAHDITDIT
 DAHDAHDITDIT DAHDAHDITDIT DAHDAHDITDIT
 DAHDAHDITDAH DAHDAHDITDAH DITDAH DITDAH
 DAHDAHDITDIT DAHDAHDITDIT DAHDAHDITDAH DITDAH

DAHDAHDITDIT DAHDAHDITDAH DITDAH DAHDAHDITDIT
 DAHDAHDAHDAHDAH DAHDAHDAHDAHDAH DAHDAHDAHDAHDAH
 DAHDAHDAHDAHDAH DAHDAHDAHDAHDAH
 DAHDITDITDITDITDAH DAHDITDITDITDITDAH
 DAHDITDITDITDITDAH DAHDITDITDITDITDAH
 DAHDITDITDITDITDAH DAHDAHDAHDAHDAH
 DAHDAHDAHDAHDAH DAHDITDITDITDITDAH
 DAHDITDITDITDITDAH DAHDAHDAHDAHDAH
 DAHDITDITDITDITDAH DAHDAHDAHDAHDAH
 DAHDAHDITDIT DITDAH DAHDAHDITDAH DITDAH
 DAHDAHDITDAH DAHDAHDITDIT DAHDAHDITDAH
 DAHDAHDITDIT DITDAH DAHDAHDITDAH DITDAH
 DAHDAHDITDAH DAHDAHDITDIT DITDAH DAHDAHDITDAH
 DAHDITDITDITDITDAH DAHDAHDAHDAHDAH
 DAHDAHDAHDAHDAH DAHDAHDAHDAHDAH
 DAHDITDITDITDITDAH DAHDITDITDITDITDAH
 DAHDAHDAHDAHDAH DAHDITDITDITDITDAH
 DAHDITDITDITDITDAH DAHDAHDAHDAHDAH
 DAHDITDITDITDITDAH DAHDAHDAHDAHDAH
 DAHDITDITDITDITDAH DAHDITDITDITDITDAH

- (5) Transmit slowly and distinctly the following character sounds while concentrating upon the characters for which they stand:

DAHDITDITDAHDIT DAHDITDITDAHDIT DAHDITDITDAHDIT
 DAHDITDITDAHDIT DAHDITDITDAHDIT
 DITDITDAHDAHDITDIT DITDITDAHDAHDITDIT
 DITDITDAHDAHDITDIT DITDITDAHDAHDITDIT
 DITDITDAHDAHDITDIT DAHDAHDAHDITDITDIT
 DAHDAHDAHDITDITDIT DAHDAHDAHDITDITDIT
 DAHDAHDAHDITDITDIT DAHDAHDAHDITDITDIT
 DITDAHDAHDIT DITDAHDAHDIT DITDAHDAHDIT
 DITDAHDAHDIT DITDAHDAHDIT DAHDAHDAHDAHDIT
 DAHDAHDAHDAHDIT DAHDAHDAHDAHDIT DAHDAHDAHDAHDIT
 DAHDAHDAHDAHDIT DAHDITDAHDAHDITDAH
 DAHDITDAHDAHDITDAH DAHDITDAHDAHDITDAH

DAHDITDAHDAHDITDAH DAHDITDAHDAHDITDAH
 DAHDITDITDAHDIT DAHDITDITDAHDIT
 DITDITDAHDAHDITDIT DITDITDAHDAHDITDIT
 DAHDAHDAHDITDITDIT DAHDAHDAHDITDITDIT
 DITDAHDAHDIT DITDAHDAHDIT DAHDAHDAHDAHDIT
 DAHDAHDAHDAHDIT DAHDITDAHDAHDITDAH
 DAHDITDAHDAHDITDAH DAHDITDITDAHDIT
 DITDITDAHDAHDITDIT DAHDAHDAHDITDITDIT
 DITDAHDAHDIT DAHDAHDAHDAHDIT DAHDITDAHDAHDITDAH
 DAHDITDITDAHDIT DITDITDAHDAHDITDIT
 DAHDAHDAHDITDITDIT DITDAHDAHDIT
 DAHDAHDAHDAHDIT DAHDITDAHDAHDITDAH
 DAHDITDAHDAHDITDAH DAHDITDAHDAHDITDAH
 DAHDITDAHDAHDITDAH DAHDAHDAHDAHDIT
 DAHDAHDAHDAHDIT DAHDAHDAHDAHDIT DAHDAHDAHDAHDIT
 DAHDAHDAHDAHDIT DITDAHDAHDIT DITDAHDAHDIT
 DITDAHDAHDIT DITDAHDAHDIT DITDAHDAHDIT
 DAHDAHDAHDITDITDIT DAHDAHDAHDITDITDIT
 DAHDAHDAHDITDITDIT DAHDAHDAHDITDITDIT
 DAHDAHDAHDITDITDIT DITDITDAHDAHDITDIT
 DITDITDAHDAHDITDIT DITDITDAHDAHDITDIT
 DITDITDAHDAHDITDIT DITDITDAHDAHDITDIT
 DAHDITDITDAHDIT DAHDITDITDAHDIT DAHDITDITDAHDIT
 DAHDITDITDAHDIT DAHDITDITDAHDIT
 DAHDITDAHDAHDITDAH DAHDITDAHDAHDITDAH
 DAHDAHDAHDAHDIT DAHDAHDAHDAHDIT DITDAHDAHDIT
 DITDAHDAHDIT DAHDAHDAHDITDITDIT
 DAHDAHDAHDITDITDIT DITDITDAHDAHDITDIT
 DITDITDAHDAHDITDIT DAHDITDITDAHDIT
 DAHDITDITDAHDIT DAHDITDAHDAHDITDAH
 DAHDAHDAHDAHDIT DITDAHDAHDIT DAHDAHDAHDITDITDIT
 DITDITDAHDAHDITDIT DAHDITDITDAHDIT
 DAHDITDAHDAHDITDAH DAHDAHDAHDAHDIT DITDAHDAHDIT
 DAHDAHDAHDITDITDIT DITDITDAHDAHDITDIT

DAHDITDITDAHDIT DITDITDAHDAHDITDIT
 DAHDAHDAHDITDITDIT DITDAHDAHDIT DAHDAHDAHDAHDIT
 DAHDITDAHDAHDITDAH DITDITDAHDAHDITDIT
 DAHDAHDAHDITDITDIT DITDAHDAHDIT DAHDAHDAHDAHDIT
 DAHDITDITDAHDIT DAHDAHDAHDITDITDIT DITDAHDAHDIT
 DAHDAHDAHDAHDIT DAHDITDITDAHDIT
 DITDITDAHDAHDITDIT DITDAHDAHDIT DAHDAHDAHDAHDIT
 DAHDITDAHDAHDITDAH DAHDITDITDAHDIT
 DITDITDAHDAHDITDIT DAHDAHDAHDITDITDIT
 DITDAHDAHDIT DAHDAHDAHDAHDIT DAHDITDITDAHDIT
 DITDITDAHDAHDITDIT DAHDAHDAHDITDITDIT
 DITDAHDAHDIT DAHDAHDAHDAHDIT DAHDITDAHDAHDITDAH

TRANSMITTING GROUP PRACTICE C-1

- (1) Transmit five lines of the letter "B" while repeating slowly and distinctly the character sound DAHDITDITDIT:

BB
 BB
 BB
 BB
 BB

- (2) Transmit five lines of the letter "G" while repeating slowly and distinctly the character sound DAHDAHDT:

GG
 GGG
 GGG
 GGG
 GGG

- (3) Transmit five lines of the letter "T" while repeating slowly and distinctly the character sound DAH:

TT
 TTT
 TTT
 TTT
 TTT

- (4) Transmit five lines of the numeral "4" while repeating slowly and distinctly the character sound DITDITDITDITDAH:

444
 444
 444
 444
 444

- (5) Transmit five lines of the letter “N” while repeating slowly and distinctly the character sound DAHDIT:

NN
 NNN
 NNN
 NNN
 NNN

- (6) Transmit five lines of the letter “H” while repeating slowly and distinctly the character sound DITDITDITDIT:

HH
 HHH
 HHH
 HHH
 HHH

- (7) Transmit five lines of the letter “Y” while repeating slowly and distinctly the character sound DAHDITDAHDAH:

YY
 YYY
 YYY
 YYY
 YYY

- (8) Transmit five lines of the numeral “5” while repeating slowly and distinctly the character sound DITDITDITDITDIT:

555
 555
 555
 555
 555

- (3) Transmit five lines of the letter “E” while repeating slowly and distinctly the character sound DIT:

[illegible]

- (4) Transmit five lines of the numeral "2" while repeating slowly and distinctly the character sound DITDITDAHDAHDAH:

222
222
222
222
222

- (5) Transmit five lines of the International Punctuation “,” (comma) while repeating slowly and distinctly the character sound DAHDAHDITDITDAHDAH:

[illegible]

- (6) Transmit five lines of the letter “K” while repeating slowly and distinctly the character sound DAHDITDAH:

[illegible]

- (6) Transmit five lines of the letter "L" while repeating slowly and distinctly the character sound DITDAH DITDIT:

[illegible]

- (7) Transmit five lines of the letter "O" while repeating slowly and distinctly the character sound DAHDAHDAH;

[illegible]

- (8) Transmit five lines of the numeral "8" while repeating slowly and distinctly the character sound DAHDAHDAHDITDIT:

[illegible]

- (9) Transmit five lines of the International Punctuation “(” (parenthesis) while repeating slowly and distinctly the character sound DAHDITDAHDAHDITDAH:

TRANSMITTING GROUP PRACTICE C-5

- (1) Transmit five lines of the letter “Z” while repeating slowly and distinctly the character sound DAHDAHDITDIT:

ZZ
 ZZZ
 ZZZ
 ZZZ
 ZZZ

- (2) Transmit five lines of the letter “A” while repeating slowly and distinctly the character sound DITDAH:

AA
 AAA
 AAA
 AAA
 AAA

- (3) Transmit five lines of the letter “Q” while repeating slowly and distinctly the character sound DAHDAHDITDAH:

QQQ
 QQ
 QQ
 QQ
 QQ

- (4) Transmit five lines of the International Punctuation “/” (fraction-bar) while repeating slowly and distinctly the character sound DAHDITDITDAH DIT:

////////////////////
 //////////////////////
 //////////////////////
 //////////////////////
 //////////////////////

- (5) Transmit five lines of the International Punctuation “?” (question-mark) while repeating slowly and distinctly the character sound DITDITDAHDAHDITDIT:

??
 ???
 ???
 ???
 ???

- (6) Transmit five lines of the International Punctuation “:” (colon) while repeating slowly and distinctly the character sound DAHDAHDAHDITDITDIT:

:::
 :::
 :::
 :::
 :::

- (7) Transmit five lines of the letter “P” while repeating slowly and distinctly the character sound DITDAHDAHDIT:

PP
 PPP
 PPP
 PPP
 PPP

- (8) Transmit five lines of the numeral “9” while repeating slowly and distinctly the character sound DAHDAHDAHDAHDIT:

999
 999
 999
 999
 999

CODE GROUP PRACTICE D

Transmit slowly and distinctly the characters of the following exercise groups:

BGTNHVFRM	JUCDEKIXSW	LOZAQPBGTN	HYVFRMJUCD
EKIXSWLOZA	QPBGTNHVVF	RMJUCDEKIX	SWLOZAQPBT
HVRJCEISLZ	QBTHVRJCEI	SLZQBTHVRJ	CEISLZQGNY
FMUDKXWOAP	GNYFNUDKXW	OAPGNYFMUD	KXWOAPBNVM
CKSOQGHFJD	IWZPTYRUEX	LAGHFJDIWZ	PTYRUEXLAB
BNVMCKSOQT	YRUEXLABNY	NCKSOQGHFJ	DIWZPBHRCI
LQTVJESZBH	RCILQGYMDX	OPNFUKWAGY	MDXOPTVJES
ZBHRCILQTV	JESZNFUKWA	GAWYNDXOPN	FUKWABYJKL
PHMEWQNRDS	AGVUIOBYJK	LPHMEWQTFC	XZGVUIOBYJ
KLPNDRSATF	CXZGVUIOHM	EWQNRDSATF	CXZBVCSQHJ
IZTRELGFWD	PYUXANMKOT	RELBVCSQHJ	IZNMKOGFDW
PYUXAHJIZT	RELBVCSQYO	XANMKOGFDW	PBFEOTMIAH
USPGRKZNJX	QYCWTMIAHU	SPVDLNJXQY	CWBFEOHUSP
VDLGRKZYCW	BFEOTMIAVD	LGRKZNJXQB	RIQVEZHCLG
MXPFKAYDOT	JSBRIQVEZN	UWGMXPFKAH	CLTJSBRIQY
DONUWGMXPV	EZHCLTJSFK	AYDONUWBMS	GJWTULGJWT
ULNCOTULNC	OHDZMCOHDZ	YEAHDZYEAV	KQYEAVKQFI
PVKQFIPRXF	IPRXBMSRXB	MSGJWBJLHE	QRSGUOYKPN
WTCZVIBJLN	DAFXGUOHEQ	RSTCZYKPMW	NDSVIBJLHE
QFXGUOKKPR	ATCZVIMWND	AFXBUZFSNE	PGCARWHKTD
QLMYINEPJO	VXHKBUZFSY	IGCARWVXTD	QMLFSNEPJO
RWHKBUZMLY	IGCAJOVXTD	QBCQJZRLGD	PUAMOTEBCQ
JZNKGDPUAH	ITEBCQYXNK	GDPVSHTIEF	WYXNKRLVSH
IMOFWYXJZR	LVSUAMOFWB	DGETKNIHXY	SVWFLROMZJ
AUQCPBETIH	SGKNXYWTIH	SVLNXYWFOH	SVLRZYWFOM
AVLRZJQFOM	AUPRZJQCMA	UPDJQCBEUP	DGKCBETIDG
KNXBKHWRA	IYLMQTXVOJ	PNSFZUHWRA	CYLMQDVOJP
EFZUBKRACG	IMQDTXJPEN	SUBKHWCGIP	LDTXVOENSF
ZBIVZCGXFA	DTSRQENWMP	KHLJBIYOUG	XVZCTSFADN
WRQEHLMPKY	OJBIVZUGXF	ACTSRQDNWM	PEHLJKYOUN

YRPIGSMBXT	WJGSNLUTWH	OCNLYZDHOV	AEYZFQKVAR
PIFQMBXRPJ	GSMUTWJCNL	UDHOCEYZDK	VAEIFQKBSJ
TLGWUNOTLC	HZNODYAHZE	VQYAKFPVQI	RFPXMRBSJM
GWPJTLCUNO	DCHZEDYAKE	QVIKFPXIRB	SXMGWBWCYQ
GLDVKTOEFN	ZKRHAIMYQX	JVPSUFBWCR	GLDMTOEJNZ
XXXXXXXXXX			
KUHAICYQXD	VPSEFBWKRG	LIMTOXJNZS	UHABLERGOK
MTZIJNAXUH	QSCYPWDVBL	EFGOKRTZIM	NAXJHQSUYF
WCVBLDFGOE	RTZKMNAIJH	QXOYPSCVWD	FBOIUGZXCT
ASDNQWEHLP	KYBOIVGZXF	TASRNQWMPH	LJYBOUVGZC
FTADRNQEMH	PKJYIU VXCL	SDRWEMFKJB	ZSEGAWKTQL
INPOXHBXSY	GAWVTQLFNP	ORHBZMYGAJ	VTQUFNPCRH
DMYEJVKUFI	CRXDMSEJWK	ULICOXDBAL	VGQOSTPZWN
BALHGQOYTP	ZVNBAFHGQR	YTPMVNJFHU	RYCMVDJFEU
RKCMIDJXEU	SKCWIDLXEO	SKZWIBQZLG	PAOTBQZNGP
AHTBQYNGPV	HTFYNRVHMF	YJRVUMFCJR	DUMECJKDUI
XXXXXX			
ECXKDSIEWX	KLSIOWXZLS	AOWPBQAGBP	QTGBPNTGHN
TYHNVYHFVY	RFVMRFJMRU	JMCUJDCUED	CKEDIKEXIK
SXIWSXLWSO	LWZOLAZOQA	ZBBGGTTNNH	HYVVFVFRRM
JJUUCDDDEE	KKIIXXSWW	LLOOZZAAQQ	PPQAZOLWSX
IKEDCUJMRF	VYHNTGPAOW	XKDUMFYNGQ	ZLSIECJRVH

CODE GROUP PRACTICE E

Transmit slowly and distinctly the characters of the following exercise groups:

12345	67890	13579	24680	14702	58396	09876
54321	13579	15948	17289	08642	24680	37260
40536	97531	14705	28423	07412	58174	07599
63369	39610	86852	15954	12984	26076	45673
37198	78062	48320	03951	16121	50527	34489
43856	73834	47809	72509	02661	17582	04287
05933	99188	24024	37151	47966	36065	18949
52927	64304	00341	62925	38581	65087	77136
19428	20657	31886	43035	55194	67463	79702
82091	10834	21093	33162	45401	57796	90872
27845	69685	11102	34935	78470	75926	62557
48486	33989	20061	13772	50637	25495	45283
64327	69188	69000	19148	15242	75339	82423
15496	66780	80991	80471	76305	17812	93329
46656	06897	08817	94607	51043	23552	19922
63406	49588	60771	68459	74003	12235	15873
12024	93684	87506	61574	48739	02021	15385
37996	14826	73864	05514	64377	28019	20518
33697	69029	15628	53044	13542	67170	82950
81339	56709	92847	18420	33124	41576	07285
98031	93650	79982	74655	10221	13447	50627
59883	09163	05978	97264	55481	12437	40526
57883	99061	03958	77962	54453	82011	42730
42556	87389	96001	93857	76952	44352	81011
72032	45586	37986	90091	83756	75942	34251
80141	02235	48536	97680	99081	73655	74932
24157	84011	22538	43596	67089	98071	63534
75922	14057	48101	52833	49566	07988	97061
53453	72912	04152	78401	82339	46506	97887
96051	43352	71952	14250	84701	32936	40596

87786	95041	33251	75972	04852	80141	82630
49586	77685	94031	23153	82759	42870	40511
16203	94857	67758	49302	11392	48254	07575
10839	10293	84756	65748	39201	61854	02903
75954	17283	19283	74655	64738	29103	05180
61947	69284	70523	18273	64564	53728	19308
19346	05907	12940	58275	16293	34855	62708
79401	10385	67492	16335	57094	10569	29486
28701	38742	19457	70054	26335	86280	94113
87296	13509	05228	39654	67487	01361	89474

CODE GROUP PRACTICE F

Transmit slowly and distinctly the characters of the following exercise groups: (In copying, the message text indicates whether right or left hand parenthesis is to be used.)

_\$, '.	(/ ? :-	- : ? /)	. ' , \$ _	_(/ . ?	' : , - \$	_ - ? \$
/ , ') .	: _ , . /	- : ? (' \$) . ' ,	\$ - ? / ' .	\$ \$ ' (?	- : / . ,	
_ / ? :-	_ _ ? ,)	: _ ' / -	? . \$ / ' -	- \$ ' : \$. ? - /	' _ . : \$	
_ / (,)	: : (,)	? , _ ? ,	. _ . : ?	' (' \$?	' \$) - /	, / : _ \$
) , / -)	\$. , - /	. ' ? : .	_ ? - _ ' : _) - .) : ? ' \$	/ : ' / ,	
_ ' , ? ?	, . - ? (' : / \$?	\$ \$. - (_ ' _ /	: _ / ? \$	' - ' \$?	
/ _ : _)	, :) (,	? . ' - .	/ - \$: .	- ' . \$ /	(: , ? _	, _ ? (/
? , ? : .	. _ ' , -	' ? ' (' - , ' _ .	. : \$: ?	:) ? _ ,	\$ \$ / / (-	
/ _ : ' ' ?	\$ - , : \$, - \$,	/ ' : _ ' , . ?) \$	' (/ / _) /) . -		
. ? . ? _	: _ ' \$ -	' \$ - / \$ (, :) _	. ' ? / -	: . / . _) (? ? /	
. ' \$? '	: / : , ,	, _ - (- \$ \$ / ,	? . ? ' /	? \$.) ' /	(. : ,	
/ ' , ' ?	, -) : \$	\$. - _ : _ : . \$	\$? ? / ,	/ ' , ' (: ' . . ,	
() ' - .	/ , \$ \$: /	\$ _ : _ - _) ? -	/ _ / ' ' \$? :) ,	, . ' .		
- : . ' \$	(, _ ? \$	- ? _ : (? - / \$	- . / : /	, _ ? , : \$ (- , .		
\$ ' ' _ .	, -) \$ _	/ _ \$:) ? : / / -	. , - ? ' : ' (? : . _) \$ \$			
. _ , ' -	' , _ . \$? (_ \$ / (/ ? / ,	: . ' - ?) - ' . : : : ? , /			
- _ . - \$	' _ , , ?	' \$ \$. _ /) (, /	? ' / .) : ? . - ' : - : : ,			
? - / \$ (_ ' ? \$, \$, \$ / ' _ , .)	' (/) / . . ? ? : : ' - : '			
, : - ? \$	/ _) - .	_ , ' / \$ \$, , _	' ' () . : .) . : / ? ? ' :			
: - , - -	: \$? _ /	- (_ . ? ' \$ _ \$ ' \$ _ (,)	. ' / ' . . (? / :			
? : - , : -	- : \$ _	? - / _) ? . \$ ' /	, ' _ . \$ (: , /			
' / : / ,	: - - \$ -	_ : - ? _ ? ? (\$.	/ ' , , ' \$) _) \$			
. ' (: /	, ? - : \$	- _ - - : _ ? ? / \$	(/ . , ' ' , (\$.			
. , ? ' ' .	: :) , /	- ? \$: _ - - - : ? ? \$ / /	, . ' ') \$. _ :			
(_ . \$?	, ' ' : .	, (- / \$? _ : - -	_ - ? : \$? / / , (
, : \$ / _) _ ? \$ ' , : ' , .	-) \$ / _ ? - : _	? - \$: / ? , / ')			
(. . ' : ,	? . - / _ , . / : -	? (' \$) . ' , \$	- ? / ' . \$ ' (? -			
: / . , _	/ ? : - _	_ \$,) : _ . : ? ' (' \$? ' \$) ? / ,	/ : _ \$ (
, / -) \$. , - / .	' ? : . _ ? - _ ' :	_ / \$? ' - ' ' - .			

:(), ?	.(: , ?	_, . --	.\$/\$?	/ _ : _)	_ : ' ' ?	\$- , : \$
, - \$, /	' : _ ,	. ? (' \$) // _ (/) . - .	? . ? _ :	_ -) - \$
: / _ , ?	. ? ' / ?	\$. (' /	(. : , /	' , ' ? ,	-) : \$ \$. - _ :
_ ? ' ' ?	/ \$,) ,	- : ? , .	' \$ \$ / :	(/ \$ - '	. - : : (?) , _ -
. / ? _	_ (\$ ' ,	_ , ' - (_ \$. \$?	? / , /)	/ - ?) /	. . : : ?
- ' ' / -	? , \$. _	_ ' ? - :	, \$ / : -	. (' / _	/ . - . _	: ' \$, \$
- , ' _ ,	/ \$) ? () - ? ? :	_ \$ ' . \$,) - , ,	. . \$ _)	/ ' ' / :
: , (? -	\$? : ? -	-- / (?	: _ ' //	_ : _) ,	_ \$. , / _	: - _ _ ?
: - ? (/	' _ \$,)	. ' / . :	, - \$ - \$? - (- ' / \$ ' -		: \$. ,)
' , . ' (/ ? \$ / ?	: _ - \$ -	_ : - ? -	/ , (: .	' , ? ' .	\$ / _) '

CODE GROUP PRACTICE G

Section No. 1

Transmit slowly and distinctly the characters of the following exercise groups:

BGH4NHY5_V	FR3\$MJU6CD	E2,KI7'XSW	1.L08(ZAQ/
? :P9-Ø4TGB	_5YHN\$3RFV	6UJM2EDC'7	1K,1WSX80L
.QAZ)9P: ?/	Ø-BTNY_F3M	UCE,I'S1L8	ZQ?P-4G_YN
3F6J2D'I,W	X0.A(P?ØG4	H5VR\$J6D2K	7XW.0)A/:9
ØTE5H\$RVUM	EC7K1S8LQZ	9:/-B4YV3J	C21X10Z/PØ

G5NR6MD7,S	OQ):ØGN5F\$	UD,7S.8A?9	4BY\$FU2CI1
XLA9?-TH_R	M6EK'WL(Q:	-T_T3VJE'K	W8.ZP/BN_3
UEISLZ?-GY	362',X.)?G	HX\$627W0A:	ØZHRUE718Q
9/TYFMC,'1	8QP4_NFJDI	WOAPØ45RJD	KX.)/9T5\$V
MCKSLZ:-BH	FJE71(?Ø_\$	6EIS.9ØGYR	U2'.Z:453U

DKXQP-T536	,XLAPTYRJ C	,8A:4_\$CKS	OQ9GHFM510
Z?NVMDIW8/	-BNV27WL)/	BY3CI1ZPGN	6D,0(ØG5\$D
7.A9B\$UC1L	9-T_ME' LQ-	_3J'W.P4VJ	2X0/Ø5RM7S
Q:NFU,S8?4	YF21XA?HR6	KW):_THVEK	8Z/B5M2S(P
B3MI8)-G_J	,WZ9_R2K09	TVUK1A-5FE	,LP4F61.QØ

YXD1.:NRCT	L/4H6CWQ?H	3D'O?TNU'S	A/Y\$EX8/G\$
J7XZØB_UI.	/T\$MKL:GX6	7L?G32,.?T	FC,0:BRE1Q
/4RDX8P_FD	WAØN3ES)95	VCSZ-H\$2WZ	-Y6'X(YM,1
AØHV7895JK	Q4NJ1OPBUC	XZØNM,QØGF	DSA4\$21A-T
REWQT3EWZ4	321/GRDS)N	\$,..?BFCX9H	MKL:_V'8PY

J1OP5670:5	U789YUIL?_	6'(-HJK./B	FE1?_61.ØG
R2.55UKQ-T	3,LPYJ,A4\$	K09HMI1ZNMI	8-N2W(HJ7)
Ø\$ES9YU'Z4	3DXP56XATR	C8:_CSQGF'	0?VDW/BV7L
/BR,0-\$D8?	G3K8Ø3C0/T	\$I(4R'LØ4M	7ZTF7.-NJ'
AGVIQHUXQB	6KAY6S/_U,	Z5CW?5J1)_	D1:YMW9VE.

Section No. 2

PH2SPF2L9N	EX:B3IZG6,	(G\$7ABU19T	M'Q_JWP4JX
/5MS:NUS?Y	2X?H6W:HE8	/YC1PND005	D.9\$CL-_EL
-3'.V200R7	QF,84F.ARK	)TXKZB\$'/Y	EO-GMX?HDL
TJS:NCI4UW	P\$'QN61937	AHC.-RIZYD	L0FK(5E04V
,9_28T61PV	, (GUW:FKZB	JS?RIA_MX:	37Q5280BMS
P31)GJW9RK	9TU1-F,P46	.0V1:NCL46	W?HDO TUZ/Y
E8GJX052)B	M8-_,SB_20	VKA5ELFIQY	D.R7/HCQ3'
?N'A\$X:\$7Z	BJ106S0GU.	4UX-T6LTJ8	4COGMOND8B
2LHE(_E.Y2	Z5DQ5,AYCA	_KQH'ZVI/N	7(F7?\$I9R'
:3KP3XPR,:	\$S9F1?MW-V	W/BULG2.G6	OBEQTC8_DA
4D)5CZNEZY	')H2AH79Y,	QNIP5K/\$K:	_I?3,?V7:R
1/F'PFW0RX	9VS'3S-6X\$	W0U8M14JOJ	.TMLB685'9
GC(Y7PTDZH	I:4EANK?N2	Q\$,/H,/310	YK?RW-5I:F
S_7PVXV596	8FX-UORS0J	L3W4M.\$1T2	QM.GEAJLVD
ZUO_C(BCZN	,0GDA\$1-TE	Q3W42/RSN,	?FXHK:V8YI
P60578UL_'	-J.VX0MQFS	42ARWTEZ31	GD)\$.VC9ML
B'PJO_7:U8	51?6)YK/HB	DQRXGE/F8T_	2?V04,:6LN
KPU.HI9JQY	7-MA5'02Z_	X4E(VSTD9F	WGCPRLB'-3
._7?\$L5I/M	OYK0J8H,-U	(N16Z\$WCA3	SBE?6.G2:U
QT,PJA4K9M	ZNI-2)H70E	9Y'4DP5XTC	:_SG'?VWB7
/F1_IZRP.5	KI-3LY,\$0H	1M8NWJ)\$SU	Z3X6AR8CYF
OD/VLB2JM(	G,929TK-EP	4I0D:N74C?	H'T'/YXZ70
5SBI-_W_KV	15,F.Y1RLH	W3ONS\$8\$XM	(38JZROUAF
L6QV.C/6QD	/UAE:JZB,-	D?GK0C/TIR	4'047T7-N'
GIHXBKYS_,	5W51_1YWV.	HSFLNXRO\$8	3830\$)RLMZ

Section No. 3

F.JAVQUQ6A	6/UZC?J)D:	M9EP2P29E:	BK4IGITIT7
GK4'B,NX_1	HS5WYWY1S5	1HX_.NHVL\$	OF03LR8R.3
(FQ\$ZVAMA6	ZJQU(U/J96	?MPC:2:DPE	?E9D/2-C0,
0'-P7G,9IB	1T'_W4'X5S	NSYXHHW8Y1	NO5.\$L_L3.
VORYF8FAR)	VZ3Z6)\$AU9	MYJPJ/M:U?	2?6:E/CPD0

D9C-E-'2ZØ	7,4IKTKB7_	SG'5XTXY84	SHONWNLH1\$
.Y.3Q5LRA_	OFZV8V(F)6	9RZUP3AJ:\$	QM?M/2/J?E
ØU:D-6PCD9	'C-7EØI24K	,T,KG1IBWB	'YOGXHLTSN
.4W\$QN12AH	.RZYL(F)50V	9_86PV(U:F	ZJ?RAM/3Y2
Ø\$/E-M?DJ:	CUP'697C-I	DØKE4,2T1,	GWKBSI_X75
8BXN2GS\$AT	W3Z41R(N.F	9HLVPY06:5	8U?_)J/BZM
ØFA2-RQE3/	D\$?CM:'JP7	U9I6-KCØ,D	41ETW2GS.B
XK_8I507YL	'H.BS3)GWR	9T1FP4.V:N	L6?HOU/Y8J
Ø5)M-_Z2VA	EFYDR/C3?'	\$:7MPIJ9KU	-,6Ø1C4WDT
SEGX2B8,_0	K5LIY.7HQ'	NAX\$ZBWF:G	1V?T.6/4LU
ØNOJ-H8MY(	25ZE_ADVYC	F/'R?73:I\$	PKM9,J-1UØ
W64SCTXDG8	EBOQ_L,5.K	YQIHA7NZ'\$	(X39SRPB16
ØG.U'-TLJ4	OMN82H)EYZ	D5AC_Y'V/7	F?IR:K3P,\$
91M-WJØSU4	X6T8CGODBL	E_.25Q,YAK	HZIN)7\$9'3
PXR:SF?WV/	B.JGLMT024	8EN(DHZCYA	'5Q7_/IV?K
F:.,RP-139W	?-SDMØXJ48	UT06GLCB.D	_QE5A2YZ,H
(KN9I\$P73:	'R\$?XF/SVØ	W6-1UBL2GO	ET8DR)CNZ'
HA7YQI5/K_	?,V:1FPWR9	S3-X\$Ø8M40	JTLUG.6BQC
_AD5ZEY)2H	9,NPK\$:13?	7R/'FØXV-S	6WULJ.MBYG
HTN4\$N3HRY	F5V_6VUFJR	M32\$EMDJCU	67CIDKE,21

CODE PRACTICE MATERIAL

The following code practice groups provide ample practice material for developing speed and exactness of copy. The quantity of material may be greatly expanded by reversing the order of the groups, reversing the sequence of the groups or by omission of alternate characters.

These groups should be practiced at a speed of approximately twenty words per minute, considering five characters as a word.

Plain language practice material may be obtained from newspapers, books or magazines.

QETUO	ADGJL	XVNRW	YIPSF	HKZCB	MQZSE	CFTBH
UMKLA	WXDRZ	DGYNQ	IOPPI	YRWLJ	GDANV	XOUTE
QKHFS	MGCZQ	TODJX	NRISH	ZBQSC	THMLW	DVYJO
PYWJD	NXUEK	FMCEU	AGLVW	YPFKC	MZEFB	UKAXR
GNIPI	RLGAV	OTQHS	BZQUD	LNYSK	BZCBM	ADGJP
YLDVU	QFBEO	GXWIF	ZMSFH	KWRYI	PRJAX	TKSCT
AJVRP	HCQET	ULXVN	OIWGN	OEHMZ	QOJNI	HBSTM
WVJPW	DXEFC	EALWP	KMEBK	XGIIL	AOQSZ	TDXRS
ZQCHL	DYOYJ	NUKMU	GVYFC	ZFUAR	NPRGV	THZQA
XYHMC	UWGOR	DOKBE	DVIKQ	FMXYP	WAUHC	TGNPZ
ZTKDN	PLNTF	ZUJWS	CSBLR	JIJVE	SOLRF	BEHAV
IYGXQ	MQDNS	BCMDJ	YDUFE	GWFMF	KRIRA	TSTJR
HQTLV	OQRWN	EMULY	KZBAG	TLVQB	OXIZS	HWYPJ
XKCAV	PCEUX	NIGOH	ZQGRK	SUDIW	VKZEJ	YZEMR
OLXHT	LICCK	VPJOF	UXPBF	LGPGU	SOVSM	TAYID
TMANF	QBWNY	AEBDW	HZHXJ	RNQCQ	JIBTW	JWXFE
LPMBX	ILOST	XSQHD	OJUMU	VFZUR	PGTBO	NHSMV
PDECA	WKEKG	IAQZD	RZCLY	YNKGY	CFANR	HVQLS
ZMGpz	FEXFS	KYRXS	TVHEL	NWOMU	UNKCA	JLUBO
WZFWI	JTCAR	CTXOG	EZDYB	BDPDQ	GIMHR	PAKJP
QUVIN	HQXHC	WODKE	VKFXP	AHTNZ	TDPNF	UWCBR
IVSOR	BHUYX	MAYMU	GROBD	IQMYW	UCGPZ	KNLTZ
JSSLJ	PELFE	AIGQQ	QVZBV	RUZEN	CHGWT	TWBUY
LEURM	MNJQO	YQKJG	KAIZL	IDHDP	SAOAF	GSEWT
NSJFC	XPVML	HFDIX	BXKTR	YOCQN	BMJDF	EWMKI

ASTRQ	LONMU	YZAPV	BOISW	TXCAP	EXIOZ	DSCDY
UGFFR	RTJHT	VWELK	BGLQX	ZHYJK	VCUNG	HQWQA
APOER	ZWIUT	YSXYT	UIEDR	EOPCR	WQASD	VFDLK
DFTGJ	HGHBY	FGJKH	NDSLZ	UJAMX	CMINB	VBKOV
CNMLP	XZQRS	DWKEY	ERLHT	ICVJF	UPFGG	SOSTY
DMAFB	NABDH	AHJNC	GKUIV	ZJZMO	XLCKP	OXBLP
UVMAI	TNQWY	EWZXR	QQYCG	DBEIF	YACTP	TNNZU
SBJVO	FHIXA	HUOOD	KMPUG	ZKPTJ	CLIEL	BAYQX
MWRKB	QXWHN	ZDLFW	SRJSR	EVGMQ	ITJXE	PBIOT
SHOUU	FUPTO	HMPEA	KKIQD	ZLYKG	CARHJ	BWWFL
MXLSX	QDJMV	XRGBZ	NSVDC	WEGAX	RZCYN	YFNCQ
PHPEE	SUPQT	FMIKU	HKYHO	KLRFA	ZAWSO	CWLMG
BXJBJ	MDGCL	QRDZX	ZBAVS	GNNEY	VWCNX	RFJOY
TIUIB	OTQSM	YFEFK	RSTHL	WMUKA	LBOZW	JCACX
GGZDB	DDZMR	AJQVN	LZGVX	SYXBE	NONCJ	UWFIT
RTOEY	BPQIH	TKPUI	HQFLI	CEHAJ	ZTKQW	GUZXD
OCDAI	BRNDM	VVGQG	XJZYO	LSNUX	EJTVI	IENFO
QWTPK	RBPHY	HIFIU	YSPMR	MSKWB	QHWDE	KXATZ
DNUCR	VOBBV	XAMGO	DQYUG	ZNTJS	JELEI	QXCOK
BVFTH	NTPFW	BISRH	YMYIU	RBIMW	CPKLZ	SLJFA
GQKDV	EZRXT	CVOUB	GUOMY	TAQNE	DZJQG	SIKJE
OHLCP	FXDFP	SVTIM	NBYBW	HRCRU	WZYML	IKJPL
GSADF	WAHXN	QZVUE	CGTTB	YEUMN	QOQJK	AZIHD
SOFGE	PSJCP	MLFIB	XTYCV	BRZNH	WWULR	MJYKG
ILDPA	ASAWN	FXVHD	XKROQ	CYQEB	NKTMJ	HUQIF
QWIER	2TYU3	IOP4A	S5DF6	GHJ7K	LZX9C	VKNØM
HZ8XC	1VBN2	MLK3J	HG4FD	5SAP6	OIU7T	YR8E9
WQØWE	2Y3Ø4	SD6H7	LXCBØ	8X1B2	L3H4D	SPOUT
8WØQ1	2UØAD	G7ZCN	8CBM3	GDAØ7	R9ØWE	T3PSF
HKXVØ	Z1NLJ	45TIT	8WRYI	456JL	9BMXV	2KHFS

6UYEQ	QEYOS	67XB8	1234S	OTEØW	RUP5G	K9NZV
MJFAI	Y9123	4DHLC	ØXBLH	DPURW	TIAFJ	ZVMCN
KG567	8QQR3	A6KCM	1MH50	YWW2I	SGLV8	VLGSI
RQ1TO	5HZBZ	BK4AU	8ØEYP	DJXNX	N3FP7	EU4F7
9ØC2J	D6T9Q	20D7C	HB3DO	RØWTP	FKVZN	J5181
Y46LB	X2HSU	EEUAG	ZNCMG	A79R3	SHXØ1	L4PTW
I5J9M	VKF6Y	QQT4G	XMBJS	7WWYA	H98NH	ATQ1U
SJCZ2	GTYØE	357VX	M46RR	IDKGC	LF082	2OFLN
1KDIE	P6ZØV	35UDQ	YS7B1	JSTØW	U5KNV	JAY13
DLØBH	PREIF	ZMNG6	HR06X	8240E	2PG9Z	MFI9T
4HCXL	DUWAJ	VCK57	QQUDZ	8MD7Ø	W3FXZ	L75T1
I69XK	SYEOG	CC3AR	RFHV1	JP824	JBVT6	ETA7N
BG09Y	SKØN4	IW5LM	2FUQQ	36C1H	OWWIG	VVGIQ
10HBB	4UØEP	JNNF7	R47Ø2	DT2AK	MM5YT	SL8LS
RY5ZZ	KA8UD	XX3PE	P9CJ6	9QIHN	25RWO	JØMS8
1P7ML	AEE4K	8KP9R	ALZ36	W2SZX	JOQT5	XCHIØ
YD91G	UUFCV	4736V	BFTGB	NDYQ0	7830Ø	WPKZJ
I14LX	HUEAZ	CG7RS	X14P2	59VFY	TDCBD	RYFVN
5HU6D	2SE3G	NMA9I	HØLPW	JMK6Q	QPLC4	YW4Z1
FR1AX	VD8ES	9B5ER	5CNS9	2DV2A	WTFBM	PQY6N
L6ØUD	GØD03	HM3II	J8JU0	72H7K	XGTQ4	XBSWW
WA9NA	Q1SC2	PØE5V	M6RDB	L02FN	KIT6Ø	3UYGM
J7U8H	HP3JZ	GY17X	4R0KC	F8PL1	DEZV5	9QACM
OWSVL	I15BK	UEDN3	7RFØJ	T26MH	YTG8G	RYHZ4
8UJXF	E37CD	9IK15	WOLVS	QPZRA	Ø4XNP	926QS
B3TW5	NJY1D	ØHREF	MF8R6	84E2G	ZF9TH	ZDWYJ
C5QU7	1SØ3K	VAILB	TOZN6	PX204	9MIAC	LUVQK
7Q5ØG	EWDM4	91F8F	WE6ZD	QRGX5	Ø2HCS	TJLAY
Y7VPU	KB63L	NOIZ2	IOXMU	P9L74	SKTAV	3YSBJ
RNHHQ	D8DØW	FZ516	SRGCA	2H1PT	JV6Y7	BOUKN

3L2YU	I2M70	XLPP9	KY4C3	RAVJ8	SBHE5	NG9Ø4
WMFQQ	FXAW6	CP1G1	6EHV0	RJBI2	7NUTK	27YLM
TPU2L	Y3XKR	I9380	CJEPV	H94BG	WAN.Q	SØFØ5
MDD85	ZSQ61	OWGVI	1HBUE	JN7R7	2T2KM	YTLLR
YZK8U	X3E39	J9ICH	W0VZG	QPB4Ø	4NFAØ	0SM5P
58SDZ	AFXPC	6QGB7	WHNT1	J2YE7	MRRKL	82LKE
TZ39Y	XJWU9	HY3CG	ØIV40	BFPND	4Ø5AM	SSHA5
ZPDX6	FC061	IVUQH	2RWJM	817LD	EKK9R	L3W2Z
JQTXH	ØY9GU	C43VF	IBD0N	5PØS4	4MAA8	PSZ65
XODCI	F1U6V	7GBTN	YQJL9	W7KW1	K3QEL	JØRZH
TXGY9	4UCF3	VDIB5	ONSPØ	A4MPA	86SZO	5XIDC
UF176	VTGBY	HNR28	MEQ73	ØWKJ1	LHEZG	RX429
FTCDY	V5UHS	3NAIØ	POM6P	804ZI	AXUSC	751TD
VPFBR	6N8G2	EHM9J	LWKQQ	KHWLG	1Z4EX	FR9D2
C5TVS	YBAUN	P3Ø6I	M008I	PZU4X	7ACTS	1Y5BR
PLO/K	IM?JU	NH:YB	G-T(V	F'RCD	E_.XS	,WZA\$
Q/MNB	?VCX.	ZLK,J	HG:FD	SA-PO	)IU'Y	TR_PE
\$WQL/	I?UHY	GTB'C	E.SWA	QMBVX	ZKJGF	S-OI'
T_\$QL	/MJN:	B-(FR	D_X,Z	\$/N/?	C.L,H	:DAP)
UYREW	P/MU:	G('D.	,A/DC	G,ZD-	)'R\$G	_-.-HT
LK?NY	-VREX	W\$M?X	LJ:SP	IY_WP	/MU:G	)'D.,
A/BCZ	,GD-(	'R\$OI	JHBTf	C_SZQ	NV.KH	FAOUT
EQPKJ	: -FDX	Z/?.,	:A)YE	LIUYT	'ESAM	VZJF-
IT\$OM	NB(R_	,\$NCL	HDPUR	W//?H	GVC.W	QBXKG
SO'_Q	PINGF	E,Q?Z	HS(TW	LMH-:	_W/VL	GAIRQ
O?:TR	.ZMCK	: -U_/	JY)CX	ANX,F	P'EKU	BZDS\$
B.JDO	Y\$PM:	(D,/C	D)RL/	?YVEW	MXJSI	_OJDF
_ZN.H	AUE/U	G'.AB	ZG-'\$	KN-RX	\$?L:P	YWIHT
CSQVK	FOTQP	?V'XQ	CJA'W	LJGRS	/XH-Y	QOU-C
,M.GP	T/NTD	WNZ:0	RKH)E	ZBLF(	_I:V_	A?KDI

EMYF.	\$V,SU	\$PJ-D	Z?,AY	LUTEA	VJ-TO	N(_\$C
HPR/H	V.QXG	<u>O</u> K:F	X/.:)	EIY'S	MZFI\$	MBR,N
LDUW?	GCWBK	S'QPU	)/ZD	'LNVX	MLSYO	HFSNK
AT/:'	,B,-R	KYRW?	JP-IB	CZVHO	EMGDA	CG(\$?
ESX:	IWJT	Q.FUQ	PNF,?	H)WLH	'WVGI	QO:RZ
C:U/Y	CAXF'	KBD\$.	DYIGE	QZSTM	-_/LA	R?T.M
K-_J(	XN,PE	UVSBJ	O\$PHR	A.SRL	:C\$ZA	_OYDQ
L-E/B	E/KP\$	KG_M,	OWI-.	NJ(QM	TXBHI	?(S?G
UJV,V	:'UFW	CFYN'	ZXDTP	:D/?)	LYEMJ	IOB_N
HU?/G	.BG'K	-X?/Y	ITSVF	TM(,C	DR?VW	XSUJF
Z.AEU	'AZ-\$	NR\$LP	WHCQK	OQPY_	B:TLB	.?FRO
GXVD_	/SCSE	KT,XA	\$I)W.	-WMVZ	ZPY\$F	ALOJ'
\$K(UR	Q?INC	/JUHD	MH':E	NGYPB	XVAWL	GSX-Q
O-,.P	/TWZO	K(ZL)	IVAKI	MF\$?U	? 'QJ'	JR/HY
UCMG	NDN:R	HEBF_	:_?DE	Y.VS\$	PG,Z(	L-WLI
OTZKU	/)A/?	'KV\$J	YIFQH	TN'/G	R?RM:	_JCNF
EUDBD	\$NE?S	WH_VA	Q:..C-	YXXPB	BS.OP	-Z.YL
TAJTO	(\$HR/	VYG_K	F/:EI	'MF\$M	MRNDW	?CBSQ
JD?AU	EX-N_	CPH.X	O:K.)	YSZIB	,LVGW	K'PT\$
GEL)Q	:\$OV/	FW/FM	DQK'N	SIRBA	MC?-?	DVPJE
COU_X	(N..I	HXZU:	SL'Y,	KYBW,	TGZJR	-AH_P
(/DLV	MSOFN	A/'O-	KR?PI	CVOMD	C)?EX	IJ_.U
U.Z'N	XLYHS	KT:,,	RYWJ_	BZWJ_	AG\$-\$	:WTQF
QPVN-	LFVPO	'?O/R	V(KCC	IIDXU	ME.'?	_ZYJ.
LTUXK	RNS,_	H,JE:	WH\$QZ	GWBA:	QG\$F-	QDT/F
(MAPF	?)L'V	IORCU	/CX'K	D.YIE	ZTM_L	R?.K_
JX,EU	SJ\$N,	HWHWG	Q:Z:Y	AFB\$D	GQ5-?	/?ATM
-(NPV	BOP'C	'LRXY	OC.T?	/ZRKE	I_I_K	EM.,\$
?XJWJ	SHQU,	GNW:H	ZF:AD	Y\$SBQ	AG/-M	-MPTN
O)B(V	?IFZU	PR.RL	CZ_OD	LE/EK	\$K_,W	I.JQM

XHJSG	U,:NW	FHZD:	ASY\$A	BQ-G/	P-MOT	N)(BI
D\$UFV	'CYX	TPCL\$	LDKWO	E,Q/_	JKP.H	IXGMS
:?,FJ	WDUZS	NAAH\$	-:QPY	/OBM(	GNI-B	UT?')
VYVCT	FXR'.	-_RZE	PD,LE	JO_H/	.GKX:	ISFM,
D?WSJ	ZAUA-	N\$PHQ	O:/)Y	MIBNU	GB'-?	YTVT:

1/2?3	45,6:	7-8(9	'Ø_\$1	2/? .3	,45:-	)6'78
9\$Ø1	34,.2	: -)'	1/.,5	-67_\$	/?.56	789Ø\$
2?34:	(''(8	9Ø1?4	6-9_2	.4-'_	Ø/35:	8'\$/3
5)792	.,7(Ø	1?, :6	8\$12,	- '1.5	6_/.6	8Ø23:
'924:	)_/_,-	7\$?57	9\$?4(	8Ø1.:	913-8	/47'2

,)_25	-Ø/46	9?,8_	?5'\$3	6(\$.:	7Ø14-	_.-_/_
5813(	Ø92,)	\$,6\$?	6924'	Ø3:8'	/57.7	Ø?:81
5(258	/,9/:	_26'?	-9?:Ø	.)\$37	_36Ø.	-\$'48
1,741	',.6/	6Ø3'2	:_,7?	7\$483	-15_.	82:94
)/-\$5	9?(Ø)	16_4_	/:\$59	271:\$	?-2-Ø	38/-.

.(?64	9.'5'	37,Ø,	81:1-	/72(2	-/6?8	? '3).
7.938	4',_5	Ø49,_	5\$6\$:	Ø17/'	/-?72	8.8?(
3_39,	9,'4\$	4Ø5Ø5	_:,\$-	61):2	61-._	/8392
),\$?9	4Ø3'5	.Ø:4_	-5\$(,	1662'	:/77?	818,Ø
/(429	5?' :3	Ø-._)	4\$651	'7276	/8:?'_	7.9-3

\$1)5/	9:2'-	?Ø(3_	66.\$'	51744	287/_	6?9:.
\$733Ø	-,844	19-11	/')2Ø	6?_ -3	\$7.11	8._5/
97? \$6	.Ø:37	,-448	5(:1'	6/ØØ'	22-7?	\$831-
.2294	/ \$5?Ø	7.63:	,74_5	8-)-:	9(1Ø7	/_822
\$_?19	932\$.	/Ø4?5	.736,	:4755	-:8.(	)996'

1_/\$8	21\$?2	Ø3/._?	4.537	,64:5	7:-.8	(8)69
'Ø'88	7'1\$Ø	/12\$?	23/._?	4.553	7,64:	577:-
.8)(6	9'Ø7'	8_9_8	1\$/2?	13/.2	?4.53	7,64:
57:-.	8(96)	'_7Ø8	'_Ø\$9	1/?23	?/.23	.,445
:756.	:)7'6	-7-(8	_'89\$	Ø\$9_1	Ø1,/4	2.?53

R'J6A1SH,8 03NP(UR'J6 I7VGK503NP M-ZØW9E2QB U'61H8\$D?F	M\$-DZ?ØFW/ A1SH,8M\$-D CURJAS,M-Z :4IVKON)'6 /T.L_YCX7G	9TE.2LQ_BY Z?ØFW/9TE. ØW9E2QB:4I 1HM-ZØF/T. 53PUR6S8-?	:C4X17VGK5 2LQ_BY:C4X VKON(RJAS, L_YCX7G53P WT2_:XV5NU
J1,\$ZF9.QY XV5NUJ1,\$Z Ø92B4V0(JS 5PJSMZWEQ: FTLYXG3UR1	47K3('AHMD F9.2Y47K3) MZWEQ:IKN' IKNRA,-Ø92 M?9L:70UA8	Ø/ELBCIGOP 'AHMD/ØE2B 18DFT4YXG3 B4V0)6H\$?/ Z/2YI5('S\$	R6S8-?WTL_ :CIGOPRA,- U6H\$?/. _C7 ._C75P'18D ØTQCV3R1M?
9L:70UJH-F NA8D/2YI5(LCGP6H?T_X 73AMØEBIOR MF2CKU',?E	E_4GN'S\$ØT 6,DW.BXKPZ 5UJ,Z924K) S-W2:VN1\$F Y)PA\$WL45J	QCV36,W.BX RS-W2:(NJ, AMØEBIO68? .Y73'HD/LC 8Ø.:G(1-/Q	KPJH-FE_4G Z9Q4K('HD/ T_X5U1\$F.Y GPRHZTB7N6 XO6MF2CKUS
D9_I3A\$WL4 . :G)R,Ø240 6\$/_7P1DTY ,Ø240H?.C5 9YK'M/BG6-	5RHZTB7N1- JMDQIN,8FL GUA-9B()SZ '8FLX3R8W_ T:5J\$9YKAD	/QX0',?EYV X36\$/_7PJM E:K1DTYGUH)U,FQ7('M/ EC06-T:51Z	PSD9_I3J8Ø WQINA-9BV(?.C5SZE:KR DGR8W_VUJ\$.43ADECOS?
2XN1Z.43HØ TC31?L7UJ- UB/Y5SØQOR XPR\$EX(H9C QGJD271Ø_K	LIPS?2XN,F E4NSØQV6D. M)9:OHF_G' N'-.IUMT4P 6ZLVSFB5A?	27(HØLIPRM XPHF_GAZQ2 \$TC3,WBKJ- JD27R\$EX)6 QGHWY01Ø_K	9:0AZ2I)'\$ I(,WBK1?L7 E4N8/Y56D. ZL('-.IUA? ,/:3SFB589
CNHWYOMT4P _51FY3AØBO 4(MEI8TXU\$ XJ?B3,TI6Ø BQ5,TI'Z_0	,/:3R-2)JZ SW:N1FY3H/ .7MEIR-2V\$ YN8E7AF:PM 8E7J?B3M.(	QK'DLG6?_5 CPSW:N9,4(.7'DLGRDQ5 .V1WC(\$2GS 6ØYN\$2GAF:	JZQKAØBO6? H/CP8TXU,9 S/4U'Z_OH9 /4U-LKH9XR P-LK1WC)RZ

BNM2K'?YP\$	L5JØ:(-Q06	FCUD_3AW4R	ZBN1/X'?YP
S9IJØ:(HT7	6FCU,E)AW4	8.G1/XM2KS	9I\$L5HT7-Q
O,EXD_38.G	R?:UZY)'ØC	R?:UJF4'ØC	6WXJF4A/I6
WX197A/IST	(197HEGSTV	,.KHEG825,	.KML0825\$Q
3MLO-_N\$Q3	DBP-_NZY(D	BPRØ4JWI'F	X6/7JWIA9Z
6:71TGA9(S	EK1TGH.5SE	K,20H.58L3	,20MQN8L3\$
-PMQN-B(\$ _	PDYU-B)Z:D	YU?CZ:RØ4?	C'FXRF11E5
'W7S.OJ/(H	2369G,LNAT	K8QP1E5M_)	S.0\$BUH23-
Y,LND:8QPZ	CM_(?4\$BUØ	X-YRFID:'W	7ZCJ/V?469
GØXATKRW),	Y('/G8U_J9	KMB6T5\$YAE	0':1.3DCS2
NZ4HLP?X,Q	(ØI8_UF7MB	RWG\$Y'/G-:	J9KDC6T5Z4
AEO?X1.3/Ø	IS2NF7HLPR	/K\$: '95-CJ	TOD46E3ZXA
.N?I12PØ7S	L(FVHQUWG,	_R/K8B'95M	YJT0\$:6E3-
CA.ND412PZ	XSL(?IHQUØ	7,_F(8BWGM	YR90ØI'T3?
7JENØV6.PF	GA2)WK1LU/	5SQR90H_'T	3,BJEN8Y6.
.M:A2(\$C1L	U-4SQDXH_Z	I,B?78YØ)M	:FG\$CWK-4/
5DXRTNXK'E	PW5J.(/062	U93ALRTN1Q	'EPS_J.)HB
62U,YAL8:1	QMCS_\$4HD-	X,YDI8:Z7M	C?(\$4ØG-XF
KDIW5Z7/0?	V93ØGRE(9N	'.UTPJ2RE(	6L'.UAQJ21
6LSBAQHY1_	,:SB8CHYM4	,:\$X8C-IM4	D7\$XZ/-DIS

INTRODUCTION TO TOUCH TYPING

The importance of the typewriter in the progressive history of civilization cannot be over-estimated. With the telephone, telegraph and radio, it has played a major part in revolutionizing our systems of commerce, communication and education. In fact, it has become a necessary article in practically every field of business and a knowledge of its operation is invaluable whether it is made a career or merely an assistance to a career.

Recent years have brought forth a wide variety of models. There are large and small machines, heavy and light, portable and stationary, black ones or those in bright colors. They are becoming popular in the education of small children and as important in the home as in the office or schoolroom.

Keyboards have been standardized so that a system of writing without watching the keyboard could be evolved. The "touch system" as it is called, is easily accessible to anyone who has a real desire to learn. If he has a typewriter at hand, he can obtain any number of books on the subject and teach himself. All the lessons, with full instructions, are laid out. By following them diligently and exercising a great deal of patience, he can train his fingers automatically to do the work which otherwise would require his full concentration on both keyboard and copy.

WHY LEARN THE TOUCH SYSTEM?

The question then arises: "do you want to become an expert typist?" In other words, "do you want to learn the 'touch system'?" Perhaps you are one of those persons who is convinced that a superficial knowledge of the typewriter keyboard is sufficient, aided, of course, by a good pair of eyes and your two index fingers.

True, this two-finger method, when persistently used, can produce a certain amount of speed, but the typist employing the "touch system" can easily double this speed, because he has trained his fingers to do the work for him easily, rapidly and automatically, without the strain of watching the keyboard.

It stands to reason that a great deal of time is lost in trying to keep the eyes on both copy and keyboard. It is impossible not to lose one's place and a jerky mode of typing, interspersed with long pauses and frequent mistakes is bound to result, not to mention undue eye strain and neck strain.

While this is not entirely true of the operator transcribing code messages received over the air, still without the "touch system" he

is decidedly at a disadvantage. In most cases, code messages are transmitted rapidly, and without the use of the touch system the typist has difficulty in transcribing them. Although his eyes are free to watch the keyboard, he must concentrate both on the code characters he hears and then finding the corresponding letters on the keyboard. Over long periods of steady work this becomes an endurance test and the operator will find it increasingly difficult to keep up the pace and must certainly fail in turning out an accurate transcription.

The "touch system" of typing has been devised to overcome such difficulties. This method becomes so easy and so mechanical that the fingers automatically fall upon the correct keys without much mental and certainly no visual concentration.

Since the "touch system" is the only method by which one can become an expert or even attain ease in simple every-day typing, why should he be satisfied with anything else? The time and effort spent in mastering this system will be well repaid.

If you wish to excel in touch typing, there are certain principles of form or technique which first must be thoroughly mastered, just as a professional tennis or golf player has to learn correct form. When a player has learned his strokes correctly in the beginning, his success as a tournament player increases only with practice. If he allows himself to acquire any defect in form, he seldom becomes a player of tournament calibre, no matter how long he plays.

This holds true in the case of an operator learning to type. The more concentration is spent in practice, proper coordination and overcoming of certain weaknesses, the less will have to be expended after attaining your goal.

KNOW YOUR TYPEWRITER

For the first step in a prescribed course for beginners, learn all you can about your typewriter, its various working parts and the care it requires. All typewriter companies have instructions pertaining to their own particular machine which can be obtained upon request.

As this section is written primarily for the use of those interested in the study of code and its transcription, we will be concerned only with the L. C. Smith New Super-Speed Typewriter, with Navy Telegraphic Keyboard, illustrated by Figures 1, 2, and 3, a model in universal use for this type of work.

Super-Speed L. C. Smith



Figure 1

INSTRUCTIONS FOR OPERATING THE NEW SUPER-SPEED L. C. SMITH

U. S. Navy Telegraphic Keyboard Machine

(Illustrated below)

Author's Note: This section made available through the courtesy of "L. C. Smith & Corona Typewriters Incorporated" of Syracuse, New York.



Figure 2

1. Paper Table

This guides the paper when inserting and supports it after it is in place. When inserting the paper, hold it at the top and in the center, not on the sides, and drop it evenly as far down as possible and with the left hand edge of the paper against the paper gauge (4). The paper table can be tipped completely forward over the platen (31).

2. Paper Gauge Indicator

Refer to Paper Gauge Scale (3) and Paper Gauge (4).

3. Paper Gauge Scale

This scale slides with the paper gauge (4). When the zero graduation on the scale is moved to the right hand edge of the slot, Paper Gauge Indicator (2), in the paper table, the left hand edge of the paper when inserted against the Paper Gauge (4) will register at zero on the Platen Scale (12).

4. Paper Gauge

This guides the left hand edge of the paper when inserted, and also makes the re-insertion of written work, for which the gauge has been set, exact and accurate. Normally, the Paper Gauge Scale (3) should be set with "0" on the Paper Gauge Indicator (2). This insures having the exact margins indicated by the positions of the margin stops. This normal left hand margin, however, can be increased or decreased independently from the position of the left hand margin stop—not shown in picture—by simply moving the paper gauge. Setting of the paper gauge to the right of "0" will increase or setting it to the left of "0" will decrease the width of the left hand margin, when the paper is again inserted against the gauge. For example, the Left Margin Stop—not shown in picture—may have been set at "15" according to the Platen Scale (12). "15" is then the normal margin when the Paper Gauge Scale (3) is set at "0" and the left hand edge of the paper inserted against the gauge; but, if a wider margin is wanted, simply move the paper gauge to the left as far as you wish to increase the margin width; or, if a narrower margin than "15" is wanted, move the gauge to the right.

5. Platen Spring Release

Pushing back this lever disengages the small roller from the line spacing ratchet so that the Platen (31) may be turned independently of the spacing produced by the ratchet without losing the original position of the lines written before pushing back this lever.

6. Line Space Regulator

The figures to the left of the regulator designate the several positions at which it can be set to obtain different distances or spaces between the lines of writing (i.e., number of teeth on the platen ratchet which the figure indicates).

To set, slightly press toward the left and at the same time move the regulator to the notch opposite the number of spaces desired; ordinarily, when the regulator is set adjacent to one of the figures, one complete movement of the Line Space Lever (11) will move the paper up that number of spaces or teeth on the Platen Ratchet.

7. Carriage Release Lever

A slight pressure on either Carriage Release Levers (7 and 27) permits the carriage to be moved to the left to any desired point.

Note: It is not necessary to use a carriage release lever when desiring to move the carriage to the right.

8. Variable Control

To disengage the variable control (not visible because mechanism is contained inside the platen roll) grasp the Platen Knob (10) normally as when turning the platen but with the hand pressing against the variable control. This releases the line spacing ratchet from the Platen (31) and makes it possible to write between regular line spacing, to write on ruled lines, or any desired position on the paper. By removing the pressure of the hand against the variable control, regular spacing resumes immediately, either with the Line Space Lever (11) or by turning the Platen Knobs (10 and 28).

9. Platen Lock

The Platen Locks (9 and 29) may be pushed back to allow the platen to be removed or replaced. They must be pushed completely forward again when the platen is in position.

10. Platen Knob

The Platen Knobs (10 and 28) are used when it is desired to turn the platen by hand instead of by means of the Line Space Lever (11).

11. Line Space Lever

To return the carriage and operate the line spacing mechanism ready to start a new line, firmly press (DO NOT SLAM, SLAMMING CAUSES PAPER TO SLIP) against this lever and move the carriage to the right. The right hand style return—not shown but supplied when desired—is operated in a similar manner with the right hand. Be sure that each movement of the line space lever is fully completed. Refer to Line Space Regulation (6).

12. Platen Scale

The graduations on this scale indicate the possible printing points in the line of writing. This scale comes into practical use for establishing margins, and in tabulating work, or for locating any desired starting position for columns, figures, etc. Refer to Line Indicator (13). The top edge of the platen scale is usually two line spaces below the top edge of the Line Indicator (13) and printing position, but this number of line spaces may be more or less depending upon the number of teeth on the platen ratchet. When regular ratchet spacing is used, the bottom edge of the characters in any line of writing is always exactly even with the top edge of the platen scale if the line of writing is turned down to it. This makes the scale useful for making certain that the paper is straight and that the lines are level across the sheet.

13. Line Indicator

This scale indicates the line level writing position, since the upper edge is exactly even with the bottom edge of the letters and usually is two full line spaces above the Platen Scale (12) which is also exactly even with the bottom edge of the letters.

The graduations in this scale also help to accurately center a letter for making corrections and insertions, as well as to avoid having a letter strike on the vertical lines of a ruled form, since the paper can be so adjusted as to have the ruled lines come half way between two graduations on the line indicator scale.

The Card and Envelope Fingers (34) on the line indicator are very helpful in ruling forms. Refer to Card and Envelope Fingers (34). Place a pencil in the corner formed by the scale and one of these fingers when raised so that the point will be held securely. Press pencil against the paper and move carriage sidewise, using Carriage Release Levers (7 and 27) for horizontal ruling. For vertical ruling, turn the platen by means of the Platen Knobs (10 and 28).

14. Ribbon Carrier

Each depression of a letter key in the keyboard brings the ribbon in position to receive the type impact. (See Hints—How To Change a Ribbon.)

15. Ribbon Spool Cover

Before attempting to raise the ribbon spool cover, move the carriage so that the Line Space Lever (11) will not interfere with raising the cover. Do not move the carriage after the cover has been raised.

In the picture above, the cover is cut away to show one ribbon spool and the touch selector. (See Hints—How to Change a Ribbon.) Refer to TOUCH SELECTOR (35).

16. Manual Ribbon Reverse

When writing, the ribbon reverses automatically. It can be reversed by hand at any time whenever desired by simply moving this knob to the left or right. (See Hints—How to Change a Ribbon).

17. Individual Tabulator Stop Clear Key

Refer to Tabulator Stops (22) and Tabulator Bar (39).

18. Back Space Key

Each full depression of this key back spaces the carriage one space.

19. Shift Lock Key

By firmly depressing this key, the type shift is locked so that only capitals or upper case characters can be written. To release the shift lock key, depress either the left hand Shift Key (20) or the right hand Shift Key (42).

20. Shift Key, also Shift Lock Release Key

When writing capitals, the type is shifted—not the carriage. When shifting for capital letters, either Shift Key (20 or 42) should be held down until the type key stroke has been completed. Do not attempt to operate the shift keys as you would a letter key, i.e., the shift key must be held down until the type key stroke has been completed and when released sufficient time permitted for the type basket to shift so that the small letter following the capital will print in line with the capital.

21. Space Bar

For spacing between words. It is operated by the thumb. (See Hints—Half Spacing.)

22. Tabulator Stops

These stops are set by depressing Tabulator Stop Set Key (40) located to the right of the Tabulator Bar (39) in the keyboard. To set a tabulator stop, move the carriage to the desired position at which the carriage is to stop when depressing the Tabulator Bar (39) and then depress the Tabulator Stop Set Key (40). Then move the carriage to the next position and again depress the key (40) and repeat until all the stops desired have been set.

To “clear” an individual tabulator stop, tabulate to the position at which the stop is located and then depress the Individual Tabulator Stop Clear Key (17) located to the left of the Tabulator Bar (39) in the keyboard.

If it is desired to “clear” all the tabulator stops that have been set, depress the Tabulator Stop Universal Clear Lever (24). It is not necessary to move the carriage to any definite position when desiring to clear all the stops at once.

23. Margin Stops

The Paper Table (1) is not tilted when setting the margin stops (right one only visible in picture where the paper table is cut away). The stops are set by means of the Margin Control Lever (25). There are two methods for setting each of the margin stops, as follows:

TO SET LEFT HAND MARGIN STOP

- A. Raise the Margin Control Lever (25) to “L Set” position, then move the carriage to the left to the desired left hand margin position, and while there return Margin Control Lever (25) to “lock” position.
- B. Move the carriage to the left to the desired margin position and then raise Margin Control Lever (25) to “L set” position, returning it immediately to “lock” position. If, however, the

left hand margin stop has already been set to the right of the desired position at which the carriage is to be moved, do not depress the Margin Release Key (41). Instead raise Margin Control Lever (25); continue moving the carriage until the proper margin is reached, after which lower the Margin Control Lever (25) to "lock" position.

TO SET RIGHT HAND MARGIN STOP

- A. Lower the Margin Control Lever (25) to "R set" position, then move the carriage to the right to the desired right hand margin position, and while there return Margin Control Lever (25) to "lock" position.
- B. Move the carriage to the right to the desired margin position and then lower Margin Control Lever (25) to "R set" position, returning it immediately to "lock" position. If, however, the right hand margin stop has been set to the left of the desired position at which the carriage is to be moved, do not depress the Margin Release Key (41). Instead lower Margin Control Lever (25); continue moving the carriage until the proper margin is reached, after which raise the Margin Control Lever (25) to "lock" position.

24. Tabulator Stop Universal Clear Lever

This lever is depressed when desiring to "clear" all the tabulator stops that have been set. Refer to Tabulator Stops (22).

25. Margin Control Lever

This lever is raised from "lock" to "L Set" when desiring to regulate the left hand margin stop and is lowered from "lock" to "R Set" for the right hand margin. Refer to Margin Stops (23).

26. Paper Release Lever

Pulling this lever forward releases the grip of the paper pressure rolls and enables an operator to straighten, to adjust the paper easily, or to insert a large number of sheets.

The release lever may be held partly in a released position with the little finger while adjusting the paper; the lever will go back of its own accord when the finger is removed, or when pulled completely forward will remain released until pushed back.

27. Carriage Release Lever

Refer to Carriage Release Lever (7).

28. Platen Knob

Refer to Platen Knob (10).

29. Platen Lock

Refer to Platen Lock (9).

30. Paper Bail

The bail rod with the small rollers can be lifted from its normal position with the rollers resting on the paper and will remain practically in any intermediate position or completely raised. The small rubber rollers on the bail rod can be moved sidewise to any desired position.

Note: The bail is standard equipment; however, paper fingers—not shown in picture—will be furnished upon request in place of the bail, i.e., the bail or paper fingers are optional.

The paper fingers—not shown in picture—are provided with small rubber rollers which allow the paper to move up or down freely. They are easily moved sidewise by hand to accommodate any width of paper. The paper fingers are **not intended** to be shoved along by the ordinary movement when writing.

When being moved, they should be held slightly away from the paper and also should not be moved beyond the edges of it so that the small rollers do not fully rest on the paper.

31. Platen

Quickly interchangeable. Convenient when desiring to use a hard, brass, card, drug label, library, and other special purpose platens. Refer to Platen Lock (9). (See Hints—How To Remove and Replace Platen.)

32. Ribbon Spool

Refer to Ribbon Spool Cover (15). (See Hints—How To Change a Ribbon.)

33. Carriage Scale

Used in connection with the Printing Indicator (36) for accurately determining the printing position of the carriage with relation to the Platen Scale (12). The graduations on the carriage scale are never in line with those on the Platen Scale (12). Refer to Printing Indicator (36).

The carriage scale is also useful when determining the desired margins with relation to the Platen Scale (12) and enables the operator to properly locate the carriage when setting the margin stops. Refer to Margin Stops (23) and Margin Control Lever (25).

34. Card and Envelope Fingers

Generally these fingers are allowed to remain up for all classes of work. When not desired, the fingers can be lowered by swinging sidewise.

To address an envelope, or to type a card, or to write on a narrow

slip of paper, when for some reason or other the Paper Bail (30) or Paper Fingers—not shown in picture—are not used to assist in holding them against the platen, the card and envelope fingers should be up.

These fingers are also very helpful in typing near the top and bottom edges of cards, particularly when the cards are quite stiff.

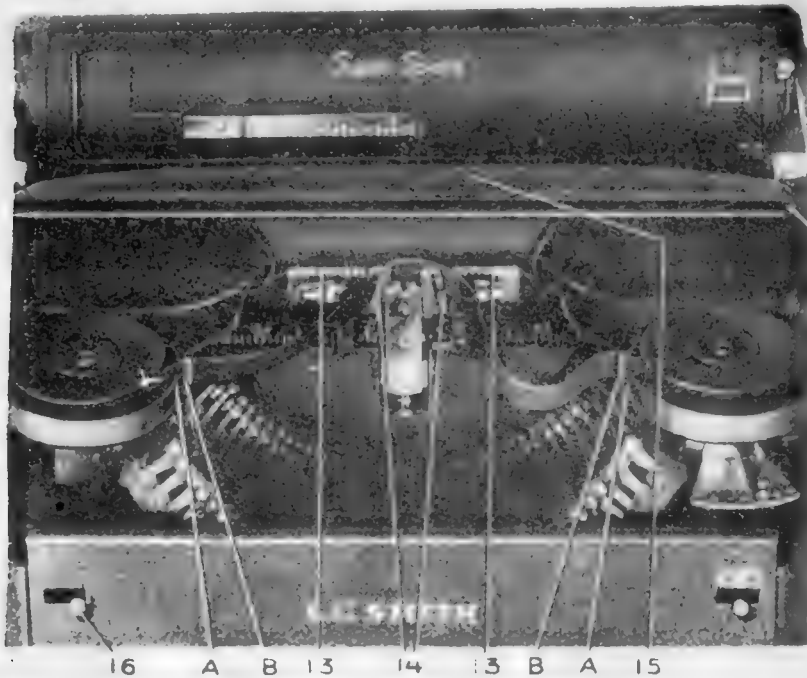


Figure 3

35. Touch Selector

The touch selector permits an operator to adjust the key lever tension to suit oneself. To do this, slightly pull upward and then move the touch selector to another location hole in the numbered dial.

It is suggested that you move the touch selector one hole at a time until the desired tension has been reached. Now observe the position or the hole number so that should the tension be changed by someone else you can instantly reset it where it was satisfactory.

36. Printing Indicator

Because the Type Bar Guide (38) covers the graduations on the Platen Scale (12) which shows the point at which the letter will print,

the printing indicator must be used to determine this point with relation to the position of the carriage. For example, if the printing indicator is brought in line with "20" on the **Carriage Scale** (33) the next character written will be at "20" on the **Platen Scale** (12). Therefore, if desiring to print at "20" on the platen scale, move the carriage to bring the printing indicator over "20" on the carriage scale. Refer to Type Bar Guide (38).

37. Ribbon Control

When this knob is set to the left, under the black colored indicator, the type will strike on the upper half of the ribbon. When the knob is set to the right under the red colored indicator, the type will strike on the lower half of the ribbon. This makes it very easy to change from one color to another if a two-color ribbon is used, or use both top and bottom of a single color ribbon, without the necessity of turning the ribbon. For stencil work, place the knob centrally between the right and left positions, under the white colored indicator; with the knob in this position, the type does not strike the ribbon at all. After stencilizing, be sure to set the ribbon control to the right or left as may be necessary, otherwise the ribbon will not cover the type when you typewrite.

38. Type Bar Guide

This guide indicates the exact position at which the next character will print on the paper. Refer to Printing Indicator (36).

39. Tabulator Bar

After having set the tabulator stops at the desired positions—Refer to Tabulator Stop Set Key (40)—the carriage can be "skipped" from one tabulator stop to another. To do so, depress and hold the tabulator bar down until the carriage comes to a complete stop, repeating this operation for each succeeding stop, if necessary, until the carriage has "skipped" to the desired printing point at which a tabulator stop has been set. The tabulator bar may also be used when desiring to "clear" an individual tabulator stop. Refer to Individual Tabulator Stop Clear Key (17).

40. Tabulator Stop Set Key

Refer to Tabulator Stops (22).

41. Margin Release Key

When the left hand margin stop—not shown in picture—has been set away from "O," for example "10," "15," etc., according to the Platen Scale (12) or the Carriage Scale (33), depressing and holding the margin release key enables you to move the carriage to the extreme left or any intermediate position between there and where the left hand margin stop is set. The right hand Margin Stop (23)—

only one shown in picture—can be passed and the locked key released by striking the margin release key. This will permit writing to the end of the line or the full line writing capacity of the carriage.

42. Shift Key also Shift Lock Release Key

Refer to Shift Lock Key (19) and Shift Key also Shift Lock Release Key (20).

HINTS FOR THE OPERATOR

How to Change a Ribbon

First move carriage over far enough for the line spacer to clear the Ribbon Spool Cover (15), then raise up the cover. NOW DO NOT MOVE CARRIAGE. Next shift Manual Ribbon Reverse (16) in the direction toward the spool having the most ribbon and, turning that spool, wind up all the ribbon. Lift off the empty spool, slightly turning if necessary, then with a quick jerk detach the ribbon in the direction that the hook points. Carefully remove the full spool.

Now shift Manual Ribbon Reverse (16) to the right. Loosen the end of the fresh ribbon and unwind a foot or so, then with the left hand grasp it about a couple of inches from the spool, holding the ribbon taut while entering the lower edge in Slot (A), at the same time placing the spool on the right hand shaft, turning it a little from side to side so that the spool will go clear down.

If your empty spool has two hooks, hold it in the left hand and with the right hand catch loose end of ribbon on hook pointing left (holding spool level). On spool with single hook pointing right, ribbon must of course be caught from opposite direction, but in either case and holding the spool right side up, wind clockwise a few turns of ribbon. Now move Manual Ribbon Reverse (16) to the left and place the spool on the left hand shaft, also turning this spool a little from side to side until it drops clear down and at the same time entering the lower edge of ribbon in Slot (A) as you did on the right side. Turn the spool to take up all the ribbon slack. The ribbon should now run straight across from one slot to the other without any twists or wrinkles. Then catch top edge of ribbon behind or under the finger of Guide (B) and pull it up level with spool.

Next, grasping ribbon with thumb and forefinger of each hand, about three inches apart, place ribbon between Ribbon Carrier (14) and Line Indicator (13), bringing lower edge of ribbon level with the openings in the prongs of the ribbon carrier (see position of ribbon at right side of carrier in illustration). With a slight tension on its lower edge, pull the ribbon lightly from side to side, working it into the openings and down until fully entered. Now give ribbon spools a turn to straighten ribbon. Lower the Ribbon Spool Cover

(15), and the change is complete.

Fastening the Typewriter

The typewriter can be fastened to the desk in various ways, the most important point being that the machine should rest level and not be fastened too solidly to the desk, as when this is done, it creates more noise than necessary. A mat under the machine will help to eliminate the desk noise to a very appreciable degree, because too solid a contact between the typewriter and the desk makes the bottom board of the desk act as a sounding board. The holding means should only serve to hold the typewriter to the desk when the desk is closed.

Oiling

Typewriters, like other machines, should be oiled occasionally at frictional points. Use the best typewriter oil obtainable, and use only enough to lubricate. A small drop applied with a typewriter oiler or a toothpick is usually sufficient.

Cleaning

Keep the machine clean. Brush off erasures and dust daily. An occasional rubbing of the machine with a slightly oiled cloth, particularly where handled, keeps the machine looking new for a long time.

Type

The type should be cleaned when necessary, using an ordinary type brush such as is furnished with the machine. Ready prepared fluid type cleaners are excellent, but care should be given not to use too much, so that the fluid runs down into the typewriter, as it destroys all oil that it touches.

Platens

The Silent L. C. Smith is regularly furnished with two silent platens. The one having a single notch cut in the end of rubber is the quieter and will satisfactorily make the ordinary number of carbon copies; the other platen having two notches in end of rubber is for heavier manifolding. For an exceptionally large number of carbon copies, a hard rubber or brass platen may be substituted for either of the above.

The Standard L. C. Smith is regularly equipped with a platen that will satisfactorily make the ordinary number of carbon copies required. If a large number of carbon copies are desired, a medium, hard, or brass platen should be used. Many operators prefer to have two or more platens when the platens can be changed as easily as on the L. C. Smith Typewriter.

Both for the Silent L. C. Smith and the Standard L. C. Smith, special platens for card writing, label writing, and for other purposes, can be furnished.

If the Paper Wrinkles

Sometimes the paper gets wrinkled when inserted. Usually this is because it has not been entered properly. Refer to Paper Table (1). If you notice that it is not entering straight, or, is showing a tendency to buckle, pulling forward slowly on the Paper Release Lever (26) loosens the grip of the paper feed rolls and allows the paper to straighten itself out after which immediately return this lever. **DO NOT LET IT SNAP BACK IN POSITION**—to do so may mark the carbon copies.

When wrinkling occurs while carbon copies are being made, the carbon sheets will also wrinkle causing “trees” to appear on the copy sheets. Carbon paper when once wrinkled will always cause this “treeing.”

If the Paper Slips

You may have used the Paper Release Lever (26) and forgotten to return it to position.

If the paper slips when line spacing with the Line Space Lever (11), this may be due to using too much force, i.e., the line space lever when slapped with the hand, so to speak, jerks the paper and inasmuch as the last carbon copy which is against the Platen (31) must be depended on to move all the other sheets, slapping the line space lever causes the original and the intermediate copies with the carbon paper to lag behind.

If Paper Enters Unevenly

When making several carbon copies at one time, the sheets sometimes slip past each other when being rolled into the machine. One way to avoid this trouble is to first pull forward the Paper Release Lever (26), then square up the sheets, for which purpose the top of the Ribbon Spool Cover (15) on the machine will be found most convenient, and insert them all well down into the machine, return the paper release level to normal position and then turn up the paper. This helps to keep the sheets even with each other and to preserve the same relative printing on the original and all copies.

Another very practical and easy way of eliminating the same trouble is to take a strip of paper about two inches wide by six inches long and crease it through the middle lengthwise. Square up the sheets and place this strip over the top of them and roll them into the machine. This will keep all the sheets level, even if a large number are inserted together.

Paper slipping usually is due to lack of lubrication on the paper feed roll bearings. To correct this difficulty, remove the platen from the machine and apply with a toothpick or something similar a very small quantity of the very best typewriter oil (two or three drops is

sufficient for the entire paper feed) on the feed roll shafts next to each feed roll. Exercise great care not to get oil on the rubber, as oil will destroy rubber. Each feed roll should spin freely.

Sometimes the platen roll and the paper feed rolls become "slick," due to an accumulation of carbon and wax from the carbon paper and oil and ink from the ribbon. This may cause the paper to slip and is also apt to make streaks and lines on it. To correct this, remove the platen and clean both platen and feed rolls by rubbing with a cloth moistened with alcohol.

How to Remove and Replace the Platen

To remove the platen, push back both Platen Locks (9 and 29), then grasping the platen by both knobs, lift it up straight.

To replace the platen, raise the bail completely, then if necessary, lift up the line space pawl which engages the platen ratchet to permit the Line Space Lever (11) to return to its complete normal left position; place the platen (ratchet end on side having line spacer) in position so that the end opposite the ratchet rests in the notch provided therefor in the carriage end and at the same time turning the platen slightly in the direction as though you were feeding in the paper, lower the ratchet end of the platen to its seating position after which the Platen Locks (9 and 29) can be pushed forward to lock the platen in position.

Half-Spacing

If a letter has been omitted from a word

First erase the whole word, then position the carriage so that the open space immediately following the last letter of the preceding word is at the exact printing point. Holding down the space bar, strike the first letter of the word. Release the space bar, depress it again and hold while striking the second letter. Continue this until all the letters in the word have been filled in. The corrected word will still have sufficient (but not full) spacing before and after it. Example:

Error	will success last
Corrected	will success last

If a space has been omitted between words.

First erase the whole word following the omitted space, then position the carriage so that the open space immediately following the last letter of the word preceding the one just erased is at the printing point. Depress and hold the space bar while you strike the second letter, etc., until all the word is completed. Example:

Error	willsuccess last
Corrected	will success last

If an extra letter has been put in a word.

Erase the word containing the extra letter. Position the carriage so that the open space immediately following the last letter of the preceding word is at the printing point. Space one full space. Then depress and hold down space bar while you strike the first letter of the word, repeating this for all the letters in the word. Space twice after striking the last letter. Example:

Error	will success last
Corrected	will success last

If it is desired to expand a word.

If the emphasis is desired to be given to a word by increasing the usual space between letters, but not to the extent of one full space between: Strike the first letter as usual. Depress and hold the space bar to strike the second letter. Release space bar, space one full space and strike third letter. Depress and hold space bar to strike fourth letter. Release space bar, space one full space and strike the next letter. Depress space bar, hold and strike next letter, etc.

Example:

Full space between	N A T I O N A L
Half space between	N A T I O N A L
Regular spacing	NATIONAL

How to Center a Word, Phrase, or Heading

The first thing is to find the center of the paper, or of the space over which the heading is to be centered. There are several methods for doing this, two of which are given as follows:

1. Find the center by creasing the paper, or by measuring with a ruler. Mark this spot accurately with a pencil and move carriage to bring this center mark to the exact printing point.

2. Adjust paper so that its left edge rests at "O" on the Platen Scale (12) and then note the number of the graduation where its right edge comes on the same scale. For an example, suppose that this number is 80. 80, divided by 2 gives half the width, equals 40. Move carriage so that 40 on the carriage scale is in line with the printing indicator. Having found the center, and with carriage positioned at this central point slowly spell (count) all the letters, punctuation marks, and spaces in the heading to be centered, depressing the back space key for the first letter, releasing it for the second letter, depressing it for the third, releasing it for the fourth, etc., until all the letters, punctuation marks, and spaces are so counted (spelled). If the last letter comes on the down-stroke of the back space key, strike the space bar once. The carriage should now be in the correct position to begin to write the heading. Headings with an uneven number of letter-spaces will be exactly centered; those with an even

number of spaces cannot be exactly centered and will be found one space to the left of the exact center.

POSITION AT THE TYPEWRITER

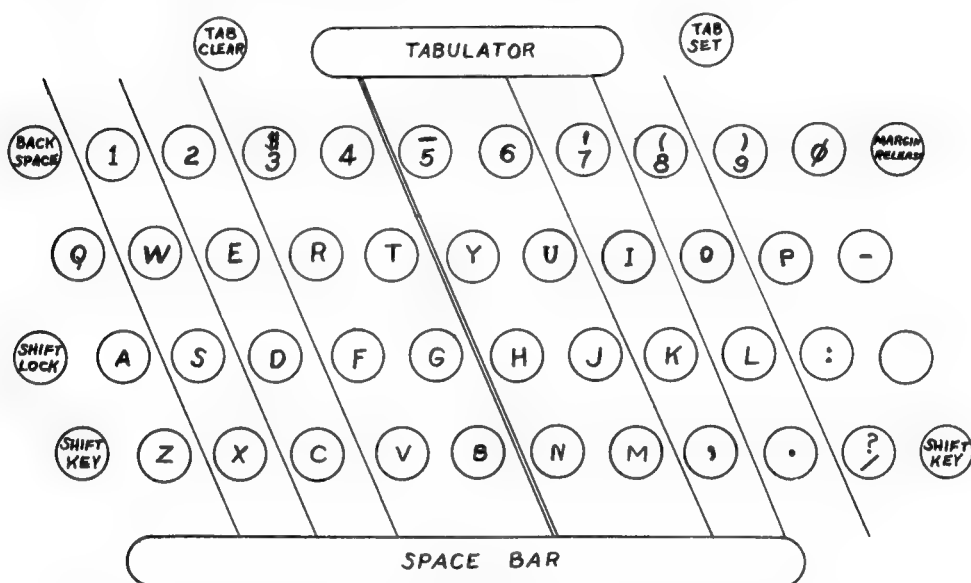
1. Operator should sit directly in front of the machine with the center of his body opposite center of the machine.
2. Be sure the distance from the typewriter allows easy and relaxed reach to all keys.
3. Sit in upright position and assure yourself that you have the proper back support.
4. Feet should be flat on the floor.
5. Forearms of the operator should be practically parallel with the slant of the keyboard. Be sure the height of the machine from the floor makes this possible.
6. The upper arms should be relaxed and close to the body.
7. Wrists should be relaxed and held low, not allowing them to touch the typewriter framework however.
8. Fingers should be relaxed and slightly curved so that the keys are struck with the balls of the fingers.
9. Avoid unnecessary arm and wrist movement.

A strict observance of these rules will enable the trained operator to type without interruption over long periods of time with a minimum degree of strain.

TOUCH TYPING FOR RADIO OPERATORS

The following instructions on touch typing are to be followed in conjunction with the preceding practice material. These instructions and practice sessions will rapidly develop speed and accuracy in code reception. It is to be assumed that the student diligently followed the preceding practice instructions and that the association between the typewriter keyboard and distinctive character sounds are thoroughly fixed in the mind and develop distinct muscular reactions.

As an aid in refreshing the memory as to the keyboard positions of the various characters the illustration below has been prepared showing the keyboard in its entirety. The illustration shows the "U. S. Navy Telegraphic Keyboard" which consists of forty-one keys which print forty-seven characters. (The characters having no code equivalent have been omitted for simplicity and to avoid confusion).



Study the illustration until it has been thoroughly memorized since it will not be shown again and succeeding study precludes referring to it. It will be noted that a heavy double line divides the right and left hand sections of the keyboard, those characters to the right of the double line are to be typed with the fingers of the right hand and those characters to the left of the double line are to be typed with the left hand. The shift key is to be operated by the fourth finger of the hand which is not being used to type a particular character requiring shifting of the typewriter carriage.

BASE POSITION PRACTICE

The base or home position is the position from which every initial stroke is made and to which the fingers must return after making a stroke or series of strokes away from the base position. These keys are A, S, D, F, J, K, L, and :. From this position a greater number of keys can be reached with maximum effort than from any other location on the keyboard. The fingers should touch these keys very lightly when not actually striking the letters.

Place the fingers on the home keys as indicated, first the left hand, and then the right. Move the hands slightly away from the home position and then find it again. After practicing this many times from varying distances from the keyboard, each hand separately and then both hands at the same time, try to find the correct position without watching the keyboard, but checking afterwards to see if your fingers are correctly placed. By doing this repeatedly you will get the feel of the home keys and will find them easily without watching the keyboard.

Try operating the carriage return. This is done with the left hand on the standard machine, although a right hand shift can be obtained if desired. The hand should be extended palm down, fingers together to brace one another and the return lever should be struck with the first finger between the first and second joints. Practice this until you can do it and return your fingers to home position rapidly and correctly, without watching the keyboard.

In practicing the drills which follow, do not allow yourself to become too tired. When you find your attention lagging or the fingers becoming strained, stop for awhile and resume practice from this point after you have rested. It is not necessary that you rush through the lessons in an attempt to finish them in a certain time. Take your time, and if you find a point of weakness, spend extra time in strengthening that weakness. Review the drills when necessary and do not go on to the next drill until you have thoroughly mastered the preceding ones. Type slowly in the beginning, increasing your speed only in proportion to your ability to maintain perfectly rhythmical timing and an even touch. A little perfect accomplishment is worth more than a great quantity of error-studded typing. All these rules should be observed throughout the full course of lessons. In fact they should be observed always, as they apply to straight typing as well as to drill practice.

STROKING

The stroking of the keys may be divided into three separate operations which blend into one automatic impulse as speed is

acquired. First, the “reach” for the key before it is struck. Next, the actual striking of the key, followed **immediately** by the third operation which is the releasing of the key.

In making the "reach," the finger should be raised above the keyboard as it reaches for the key to be struck. The stroke should be delivered by the ball of the finger directly to the center of the key. After a sharp blow, the finger should be removed **instantly**, thus allowing the type bar to fall back into place and make way for the next stroke. The development of sharp, even strokes and instant release of the keys after the stroke is important in gaining speed and should be remembered when practicing.

The index fingers can be trained to do this with very little practice, as we have much better control over their movements. The training of the remaining fingers, however, especially the third and little fingers, will require a great deal more practice.

If you find the type "piling up" you may be sure you have failed in quickly releasing the keys. A lack of rhythmical stroking can also cause this trouble or result in uneven spacing. You will find that a greater amount of work is accomplished and unnecessary strain avoided by steady even typing than by short bursts of speed interspersed with long pauses.

DRILLS FOR THE INDEX FINGERS

Place your fingers in base position. **Do not watch the keyboard.** Keep your eyes on the diagram to learn the relative positions of the various letters. Tap the letter “J” which is beneath the right index finger, thinking of the **sound** of the letter “J” as it is received at maximum speed. Do this with each stroke a sufficient number of times to establish a subconscious association between the sound and the stroke.

Remember previous instructions in regard to proper stroking, i.e., rhythmical sharp taps with instantaneous recoil. Keep the other fingers lightly on the home keys and confine the action as much as possible to your fingers only, avoiding any unnecessary wrist and arm movement. **Type slowly**, a solid line of the letter "J", as follows:

JJJ

After completion of one line and the carriage return bell rings, return the carriage immediately. Now inspect your work for evenness of touch. The letters should be the same shade across the page. If letters are too light, adjust the touch control, but remember, the lighter the touch, the less will be the effort expended in turning out your work. If your work is unsatisfactory, repeat that part of the drill. Conquer your weaknesses as you go along.

Try this same exercise with the letter "F", which lies under the left hand index finger:

FFF.

Write a line alternating these two letters in groups of four with one space between as in the following. Use only the right thumb on the space bar. Always remember to keep the code sounds in mind as each key is depressed. Avoid wrist action as much as possible.

JFJF JFJF JFJF JFJF JFJF JFJF JFJF JFJF

Now extending the index fingers toward the center from their home positions, your left finger will rest on the letter "G" and your right finger on the letter "H". Write the letter "H" as you did the letter "J" above:

HH

Do not continue with the next drill until you have completed the preceding ones perfectly.

Now write a line of the letter "G" in the same manner:

GG

Alternate these two letters as in the exercise above:

HGHG HGHG HGHG HGHG HGHG HGHG HGHG HGHG

After practicing the foregoing drills for a sufficient length of time you will have four definite "sound-stroke" associations which will serve as a nucleus around which we shall construct the succeeding drills. These first four "sound-stroke" associations will be used in succeeding drills often enough so that you will not lose the associations.

The following drills are devised so as to avoid monotony as much as possible. The proper method for executing these drills to gain speed as a radio operator is as follows: Glance at the particular drill you are practicing, then look away, receive it mentally in code at your maximum receiving speed. As you receive each letter, type it. Repeat each one until you begin to get a definite association between the **sound** of a letter and its proper stroking. Remember that when you tune in a code station you don't receive pictures of printed letters, but **sound** only. Therefore, when practicing these drills, **do not keep watching the drill**. Glance at it, look away and immediately translate it to the proper sound in code, repeating it at your maximum receiving speed.

TYPING PRACTICE EXERCISES

(In the following exercises it is to be assumed that the typewriter is utilized instead of pencil while printing the characters.)

Exercise 1

Refer to Character Group Practice A-1, page 27, and perform exercises 2, 3, 4, 5, 6, 9 and 10.

Exercise 2

Refer to Character Group Practice A-2, page 31, and perform exercises 2, 3, 4, 5, 6, 7, 10 and 11.

Exercise 3

Refer to Character Group Practice A-3, page 36, and perform exercises 2, 3, 4, 5, 6, 7, 10 and 11.

Exercise 4

Refer to Character Group Practice A-4, page 41, and perform exercises 2, 3, 4, 5, 6, 9 and 10.

Exercise 5

Refer to Character Group Practice A-5, page 45, and perform exercises 2, 3, 4, 5, 6, 9 and 10.

Exercise 6

Refer to Character Group Practice A-6, page 49, and perform exercises 2, 3, 4, 5, 6, 7, 10 and 11.

Exercise 7

Refer to Character Group Practice A-7, page 54, and perform exercises 2, 3, 4, 5, 6, 9 and 10.

Exercise 8

Refer to Character Group Practice A-8, page 58, and perform exercises 2, 3, 4, 5, 6, 7, 10 and 11.

Exercise 9

Refer to Character Group Practice A-9, page 63, and perform exercises 2, 3, 4, 5, 8 and 9.

Exercise 10

(A) Refer to Character Group Practice A-10, page 66, and perform exercises 2, 3, 4, 5, 6, 7, 8, 11 and 12.

(B) Refer to Character Group Practice A-11, page 72, and perform exercises 2, 3, 4, 7 and 8.

TOUCH TYPING COPY EXERCISES

Mentally repeat the character sounds in the following exercises while typing the characters. Do not look at the keyboard, concentrate upon the character sound and the proper muscular typing movement. After completing a section check it thoroughly to ascertain its correctness. Note in particular the depth of typing, or shading of the typed character and uniformity of spaces.

Exercise 1

Refer to Transmitting Group Practice B-1, page 79, and perform exercises 1, 2, 3, 4 and 5.

Exercise 2

Refer to Transmitting Group Practice B-2, page 84, and perform exercises 1, 2, 3, 4 and 5.

GROUP COPY EXERCISES

The following exercises serve mainly as typing practice material. If at all possible arrange to have the groups transmitted to you by a second person such as a fellow student or an experienced operator. If such a procedure is impossible the groups may be practiced by glancing at a particular group and then mentally transmitting the character sounds to yourself. Under no circumstance permit yourself to glance at the typewriter keyboard, and, if at all possible, refrain from constantly watching the copy.

Exercise 1

Refer to Code Group Practice D, page 104, and perform the exercise until you can make perfect copy of all groups.

Exercise 2

Refer to Code Group Practice E, page 106, and perform the exercise until you can make perfect copy of all groups.

Exercise 3

Refer to Code Group Practice F, page 108, and perform the exercise until you can make perfect copy of all groups.

Exercise 4

Refer to Code Group Practice G, page 110, and perform the exercise until you can make perfect copy of all groups.

TOUCH TYPING PRACTICE MATERIAL

The Code Practice Material, page 113, in addition to plain language copy from newspapers and magazines will serve admirably to gain speed and accuracy of typing. Having learned the code thoroughly, and touch typing well, it only remains to practice diligently until a satisfactory degree of speed and accuracy is attained. If a C.W. (continuous wave) receiver is available it may be tuned to the commercial telegraph stations, the traffic of such being excellent copy material. (*You are cautioned to destroy all copy made of commercial stations to comply with the secrecy provisions of the Communications Act.*)

APPENDIX I
FEDERAL COMMUNICATIONS COMMISSION RULES
GOVERNING COMMERCIAL RADIO OPERATORS

GENERAL

§ 13.1 **Licensed operators required.**—Unless otherwise specified by the Commission, the actual operation of any radio station for which a station license is required shall be carried on only by a licensed radio operator of the required class.

§ 13.2 **Class of licenses.**—The classes of commercial operator licenses issued by the Commission are:

- (a) Commercial radiotelephone group:
 - (1) Radiotelephone second-class operator license.
 - (2) Radiotelephone first-class operator license.
- (b) Commercial radiotelegraph group:
 - (1) Radiotelegraph second-class operator license.
 - (2) Radiotelegraph first-class operator license.
- (c) Restricted commercial group:
 - (1) Restricted radiotelephone operator permit.
 - (2) Restricted radiotelegraph operator permit.

§ 13.3 **Dual holding of licenses.**—A person may not hold more than one radiotelegraph operator license (or restricted radiotelegraph permit) and one radiotelephone operator license (or restricted radiotelephone operator permit) at the same time.

§ 13.4 **Term of licenses.**—Commercial operator licenses are normally issued for a term of 5 years from the date of issuance.

APPLICATIONS

§ 13.11 **Procedure.**—The application form in duplicate for operator license, properly completed and signed, shall be submitted in person or by mail to the office at which the applicant desires to be examined, which office will make the final arrangements for conducting the examination. If the application is for renewal of license, it must be submitted during the last year of the license term and if the service requirements are fulfilled the renewal license may be issued by mail. A renewal application shall also be accompanied by the license to be renewed.

§ 13.12 **Special provisions, radiotelegraph first class.**—An applicant for the radiotelegraph first-class operator license must be at least 21 years of age at the time the license is issued and shall have had an aggregate of 1 year of satisfactory service as a radiotelegraph operator manipulating the key of a manually operated radiotelegraph station on board a ship or in a manually operated coastal telegraph station.

EXAMINATIONS

§ 13.21 **Examination elements.**—Written examinations will comprise questions for one or more of the following examination elements:

(1) *Basic law.*—Provisions of law and regulation with which every operator should be familiar.

(2) *Basic theory and practice.*—Technical matters appropriate for every class of license except restricted radiotelephone operator permit.

(3) *Radiotelephone.*—Additional matters, both legal and technical, including radiotelephone theory and practice.

(4) *Advanced radiotelephone.*—Theory and practice applicable to broadcast station operation.

(5) *Radiotelegraph.*—Additional matters, both legal and technical, including radiotelegraph theory and practice.

(6) *Advanced radiotelegraph.*—Radiotelegraph theory and practice of wider scope, particularly with respect to ship radio matters (direction finders, ship radiotelephone stations, spark transmitters, etc.).

§ 13.22 **Examination requirements.** — Applicants for original license will be required to pass examinations as follows:

(a) Radiotelephone second-class operator license:

(1) Ability to transmit and receive spoken messages in English.

(2) Written examination elements: 1, 2, and 3.

(b) Radiotelephone first-class operator license:

(1) Ability to transmit and receive spoken messages in English.

(2) Written examination elements: 1, 2, 3, and 4.

(c) Radiotelegraph second-class operator license:

(1) Ability to transmit and receive spoken messages in English.

(2) Transmitting and receiving code test of sixteen (16) code groups per minute.

(3) Written examination elements: 1, 2, 5, and 6.

(d) Radiotelegraph first-class operator license:

(1) Ability to transmit and receive spoken messages in English.

(2) Transmitting and receiving code test of twenty-five (25) words per minute plain language and twenty (20) code groups per minute.

(3) Written examination elements: 1, 2, 5, and 6.

(e) Restricted radiotelephone operator permit:

(1) Ability to transmit and receive spoken messages in English.

(2) Written examination element: 1.

(f) Restricted radiotelegraph operator permit:

(1) Transmitting and receiving code test of sixteen (16) code groups per minute.

(2) Written examination elements: 1, 2, and 5.

§ 13.23 **Form of writing.**—Written examinations shall be in English and shall be written by the applicant in longhand in ink, except that diagrams may be in pencil.

§ 13.24 **Passing mark.**—A passing mark of 75 percent of a possible 100 percent will be required on each element of a written examination.

§ 13.25 **New class, additional requirements.**—The holder of a license, who applies for another class of license, will be required to pass only the added examination elements for the new class of license.

§ 13.26 **Canceling and issuing new licenses.**—If the holder of a license qualifies for a higher class in the same group, the license held will be canceled upon the issuance of the new license. Similarly, if the holder of a restricted operator permit qualifies for a first- or second-class operator license of the corresponding type, the permit held will be cancelled upon issuance of the new license.

§ 13.27 **Eligibility for reexamination.**—An applicant who fails an examination element will be ineligible for 2 months to take an examination for any class of license requiring that element. Examination elements will be graded in the order listed, and an applicant may, without further application, be issued the class of license for which he qualifies.

§ 13.28 **Renewal examinations and exceptions.**—A license may be renewed without examination provided the service record on the license shows at least 3 years' satisfactory service in the aggregate during the license term and while actually employed as a radio operator under that license; or shows at least 2 years' service in the aggregate, under the same conditions, of which 1 year must have been continuous and immediately prior to the date of application for renewal.

If the above requirements have not been fulfilled, but the service record shows at least 3 months' satisfactory service in the aggregate, while actually employed as a radio operator under the license during the last 3 years of the license term, a license may be renewed upon the successful completion of a renewal examination which may be taken at any time during the last year of the license term.

Renewal examinations will consist of the same elements as for original licenses. However, the written examination will be directed toward a determination of the applicant's qualifications to continue to hold the license for which he has previously qualified. If the renewal examination is not successfully completed before expiration of the license sought to be renewed, or if the service is not acceptable, the applicant will be examined as for the original license.

CODE TESTS

§ 13.41 **Transmitting speed requirements.**—An applicant is required to transmit correctly in the International Morse Code for 1 minute at the rate of speed prescribed in these rules for the class of license desired.

§ 13.42 **Transmitting test procedure.**—Transmitting tests shall be performed by the use of the conventional Morse key except

that a semi-automatic key, if furnished by the applicant, may be used in transmitting code tests of 25 words per minute.

§ 13.43 **Receiving speed requirements.**—An applicant is required to receive the International Morse Code by ear, and legibly transcribe, consecutive words or code groups for a period of 1 minute without error at the rate of speed specified in the rules for the class of license for which application is made.

§ 13.44 **Receiving test procedure.**—Receiving code tests shall be written in longhand either in ink or pencil except that in the case of the 25 words per minute code test, a typewriter may be used when furnished by the applicant.

§ 13.45 **Computing word or code groups.**—Each five characters shall be counted as one word or code group. Punctuation marks or figures count as two characters.

SCOPE OF AUTHORITY

§ 13.61 **Operator's authority.**—The various classes of commercial operator licenses issued by the Commission authorize the holders thereof to operate radio stations, except amateur, as follows:

(a) *Radiotelephone second-class operator license.*—Any station while using type A-0, A-3, A-4, or A-5 emission except standard broadcast stations, International Broadcast stations, or high frequency and television broadcast stations licensed for commercial operation, or ship stations licensed to use power in excess of 100 watts and type A-3 emission for communication with coastal telephone stations.

(b) *Radiotelephone first-class operator license.*—Any station while using type A-0, A-3, A-4, or A-5 emission except ship stations licensed to use a power in excess of 100 watts and type A-3 emission for communication with coastal telephone stations.

(c) *Radiotelegraph second-class operator license.*—Any station while using type B, A-0, A-1, A-2, A-3, or A-4 emission except—

(1) Any of the various classes of broadcast stations other than a relay broadcast station, or

(2) On a passenger vessel required by treaty or statute to maintain a continuous radio watch by operators or on a vessel having continuous hours of service for public correspondence, the holder of this class of license may not act as chief operator.

(3) On a *vessel* (other than a vessel operated exclusively on the Great Lakes) required by treaty or statute to be *equipped* with a *radiotelegraph* installation, the holder of this class license may not act as chief or sole operator until he has had at least 6 months' satisfactory service as a qualified radiotelegraph operator on a vessel of the United States.

(d) *Radiotelegraph first-class operator license.*—Any station while using type B, A-O, A-1, A-2, A-3, or A-4 emission except—

(1) Any of the various classes of broadcast stations other than a relay broadcast station.

(2) On a *cargo vessel* (other than a vessel operated exclusively on the Great Lakes) required by treaty or statute to be *equipped* with a *radiotelegraph* installation, the holder of this class license may not act as chief or sole operator until he has had at least 6 months' satisfactory service as a qualified radiotelegraph operator on a vessel of the United States.

(e) *Restricted radiotelephone operator permit*.—Any station while using type A-0, A-3, or A-4 emission: *Provided, That*—

(1) Such operator is prohibited from making adjustments that may result in improper transmitter operation.

(2) The equipment is so designed that none of the operations necessary to be performed during the course of normal rendition of service may cause off-frequency operation or result in any unauthorized radiation.

(3) Any needed adjustments of the transmitter that may affect the proper operation of the station are regularly made by or in the presence of an operator holding a first or second class license, either telephone or telegraph, who shall be responsible for the proper operation of the equipment.

Exceptions:

(1) The permit is not valid for the operation of any of the various classes of broadcast stations other than a relay broadcast station.

(2) The permit is not valid for the operation of a coastal telephone station or a coastal harbor station other than in the Territory of Alaska.

(3) The permit is not valid for the operation of a ship station licensed to use type A-3 emission for communication with coastal telephone stations.

(f) *Restricted radiotelegraph operator permit*.—Any station while using type B, A-0, A-1, A-2, A-3, or A-4 emission: *Provided, That*, in the case of equipment designed for and using type A-3 or A-4 emission—

(1) Such operator is prohibited from making adjustments that may result in improper transmitter operation.

(2) The equipment is so designed that none of the operations necessary to be performed during the course of normal rendition of service may cause off-frequency operation or result in any unauthorized radiation.

(3) Any needed adjustments of the transmitter which may affect proper operation of the station are regularly made by or in the presence of an operator holding a first or second class license, either telephone or telegraph, who shall be responsible for the proper operation of the equipment.

Exceptions:

(1) The permit is not valid for the operation of any of the various classes of broadcast stations other than a relay broadcast station.

(2) The permit is not valid for the operation of a ship station licensed to use type A-3 emission for communication with coastal telephone stations.

(3) The license is not valid for the operation of a radiotelegraph station on board a vessel required by treaty or statute to be equipped with a radio installation.

(4) The license is not valid for the operation of any ship telegraph, coastal telegraph, or marine-relay station open to public correspondence.

§ 13.62 **Special privileges.**—(a) Any operator may operate any station in the experimental service, while using frequencies above 300000 kilocycles.

(b) Subject to the limitations set forth herein, the holder of any class radiotelephone operator license may operate a radiotelephone point-to-point station, a coastal harbor, or coastal telephone station while using A-1 or A-2 emission, for testing or other transmission entirely secondary and incidental to the service of such station.

§ 13.63 **Operator's responsibility.**—The licensed operator responsible for the maintenance of a transmitter may permit other persons to adjust a transmitter in his presence for the purpose of carrying out tests or making adjustments requiring specialized knowledge or skill, provided that he shall not be relieved thereby from responsibility for the proper operation of the equipment.

§ 13.64 **Obedience to lawful orders.**—All licensed radio operators shall obey and carry out the lawful orders of the master or person lawfully in charge of the ship or aircraft on which they are employed.

§ 13.65 **Damage to apparatus.**—No licensed radio operator shall willfully damage, or cause or permit to be damaged, any radio apparatus or installation in any licensed radio station.

§ 13.66 **Unnecessary, unidentified, or superfluous communications.**—No licensed radio operator shall transmit unnecessary, unidentified, or superfluous radio communications or signals.

§ 13.67 **Obscenity, indecency, profanity.**—No licensed radio operator or other person shall transmit communications containing obscene, indecent, or profane words, language, or meaning.

§ 13.68 **False signals.**—No licensed radio operator shall transmit false or deceptive signals or communications by radio, or any call letter or signal which has not been assigned by proper authority to the radio station he is operating.

§ 13.69 **Interference.**—No licensed radio operator shall willfully or maliciously interfere with or cause interference to any radio communication or signal.

§ 13.70 **Fraudulent licenses.**—No licensed radio operator or other person shall obtain or attempt to obtain, or assist another to obtain, an operator's license by fraudulent means.

MISCELLANEOUS

§ 13.71 **Issue of duplicate license.**—An operator whose license or permit has been lost, mutilated, or destroyed, shall immediately notify the Commission. A sworn application for duplicate should be submitted to the office of issue embodying a statement attesting to the facts thereof. If a license has been lost, the applicant must state that reasonable search has been made for it, and further, that in the event it be found either the original or the duplicate will be returned for cancelation. The applicant must also give a statement of the service that has been obtained under the lost license.

§ 13.72 **Exhibiting signed copy of application.**—When a duplicate operator license or permit has been requested, or request for renewal upon service has been made, the operator shall exhibit in lieu thereof a signed copy of the application for duplicate, or renewal, which has been submitted by him.

§ 13.73 **Supervision of examinations for permit.**—Persons other than employees of the Commission may be authorized to supervise examinations for Restricted Radiotelephone Operator Permits for one or more employees of a division of local or State Government: *Provided*—

(a) That the absence of such employees for the purpose of taking an examination at a field office or designated examining city would interfere with the proper functioning of the division, and

(b) That the chief of police, director of public safety, or other official of equal responsibility furnish the names of the persons to be examined and designate an official by name and title to supervise the examination. The application for supervisory examination shall be made to the inspector in charge of the district in which the applicants are located.

§ 13.74 **Verification card.**—The holder of an operator license who operates any station in which the posting of an operator license is not required, may, upon filing application in duplicate, accompanied by his license, obtain a Verification Card. This card may be carried on the person of the operator in lieu of the original operator license: *Provided*, The license is readily accessible within a reasonable time for inspection upon demand by an authorized Government representative.

§ 13.75 **Posting license or verified statement.**—The holder of a radiotelegraph or radiotelephone first or second class license who is employed as a service and maintenance operator at stations operated by holders of Restricted Operator Permits shall post at such station his operator license or a verified statement from the Commission in lieu thereof.

SERVICE

§ 13.91 **Endorsement of service record.**—A station licensee, or his duly authorized agent, or the master of a vessel acting as the agent of a licensee, shall endorse the service record appearing on said operator license, showing the call letters and types of emission of the station operated, the nature and period of employment, and quality of performance of duty.

§ 13.92 **Aviation service endorsement.**—If the operator has operated more than three stations in the aviation service, the service may be shown by giving the name of the aviation chain or company in lieu of listing the call letters of the several stations.

§ 13.93 **Service acceptability.**—Credit will be allowed only for satisfactory service obtained under conditions that required the employment of licensed operators, or when obtained at United States Government stations.

§ 13.94 **Statement in lieu of service endorsement.**—The holder of a radiotelegraph license or a restricted radiotelegraph operator permit desiring an endorsement to be placed thereon attesting to an aggregate of at least 6 months' satisfactory service as a qualified operator on a vessel of the United States, may, in the event documentary evidence cannot be produced, submit to any office of the Commission a statement under oath accompanied by the license to be endorsed, embodying the following:

- (a) Names of ships at which employed;
- (b) Call letters of stations;
- (c) Types of emission used;
- (d) Type of service performed as follows:
 - (1) Manual radiotelegraph operation only; and
 - (2) Transmitter control only; or
 - (3) Combination of (1) and (2) running concurrently;
- (e) Whether service was satisfactory or unsatisfactory;
- (f) Period of employment;
- (g) Name of master, employer, licensee, or his duly authorized agent.

APPENDIX II

FIELD OFFICES OF THE FEDERAL COMMUNICATIONS COMMISSION

The following is a list of the radio districts, giving the address of each field office of the Commission and the territory embraced in each district:

Radio district	Address of the inspector in charge	Territory within district	
		States	Counties
1	Customhouse, 7th floor, Boston, Mass.	Connecticut..... Maine..... Massachusetts..... New Hampshire..... Rhode Island..... Vermont.....	All counties. Do. Do. Do. Do. Do.
2	748 Federal Bldg., 641 Washington St., New York, N. Y.	New Jersey..... New York.....	Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union, and Warren. Albany, Bronx, Columbia, Delaware, Dutchess, Greene, Kings, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Schenectady, Suffolk, Sullivan, Ulster, and Westchester.
3	Room 1200, New U. S. Customhouse, 2d and Chestnut Sts., Philadelphia, Pa.	Delaware..... New Jersey..... Pennsylvania.....	Newcastle. Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Ocean, and Salem. Adams, Berks, Bucks, Carbon, Chester, Cumberland, Dauphin, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Perry, Philadelphia, Skuylkill, and York.
4	Fort McHenry, Baltimore, Md.	Delaware..... District of Columbia..... Maryland..... Virginia.....	Kent and Sussex. All. All counties. Arlington, Clark, Fairfax, Fauquier, Frederick, Loudoun, Page, Prince William, Rappahannock, Shenandoah, and Warren.
5	Room 402, New Post Office Bldg., Norfolk, Va.	North Carolina..... Virginia.....	All except district 6. All except district 4.
6	411 Federal Annex, Atlanta, Ga. Suboffice, P. O. Box 77 (208 Post Office Bldg.), Savanna, Ga.	Alabama..... Georgia..... North Carolina..... South Carolina..... Tennessee..... Florida.....	All counties except Baldwin and Mobile. All counties. Ashe, Avery, Buncombe, Burke, Caldwell, Cherokee, Clay, Cleveland, Graham, Haywood, Henderson, Jackson, McDowell, Macon, Madison, Mitchell, Polk, Rutherford, Swain, Transylvania, Watauga, and Yancey. All counties. Do. All counties except Escambia.
7	P. O. Box 150 (312 Federal Bldg.), Miami, Fla. Suboffice, 203 Post Office Bldg., Tampa, Fla.	Florida.....	
8	326 Customhouse, New Orleans, La.	Alabama..... Arkansas..... Florida..... Louisiana..... Mississippi..... Texas.....	Baldwin and Mobile. All counties. Escambia. All counties. Do. City of Texarkana only.
9	Room 404, Federal Bldg., Galveston, Tex.	.....do.....	Aransas, Brazoria, Brooks, Calhoun, Cameron, Chambers, Fort Bend, Galveston, Goliad, Harris, Hidalgo, Jackson, Jefferson, Jim Wells, Kenedy, Kleberg, Matagorda, Nueces, Refugio, San Patricio, Victoria, Wharton, and Willacy.
10	302 U. S. Terminal Annex Bldg., Dallas, Tex.	New Mexico..... Oklahoma..... Texas.....	All counties. Do. All except district 9 and the city of Texarkana.

Radio district	Address of the inspector in charge	Territory within district	
		States	Counties
11	1749 U.S. Post Office and Courthouse Bldg., Temple and Spring Sts., Los Angeles, Calif. Suboffice, 301 U. S. Customhouse and Courthouse Bldg., Union and F Sts., San Diego, Calif.	Arizona..... California..... Nevada.....	All counties. Imperial, Inyo, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, and Ventura. Clarke.
12	328 Customhouse, San Francisco, Calif.	California..... Nevada..... Guam. Midway. Wake, American Samoa.	All except district 11. All except Clarke.
13	207 New U. S. Courthouse, Portland, Oreg.	Idaho..... Oregon.....	All except district 14. All counties.
14	808 Federal Office Bldg., Seattle, Wash. Suboffice, P. O. Box 2719 7-8 Shattuck Bldg., Juneau, Alaska.	Alaska. Idaho..... Montana..... Washington.....	Benewah, Bonner, Boundary, Clearwater, Idaho, Kootenai, Latah, Lewis, Nez Perce, and Shoshone. Beaverhead, Broadwater, Cascade, Deerlodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Pondera, Powell, Ravalli, Sanders, Silver Bow, Teton, and Toole. All counties.
15	504 Customhouse, Denver, Colo.	Colorado..... Montana..... Utah..... Wyoming.....	All counties. All except district 14. All counties. Do.
16	208 Uptown Post Office and Federal Courts Bldg., 5th and Washington Sts., St. Paul, Minn.	Minnesota..... Michigan..... North Dakota..... South Dakota..... Wisconsin.....	Do. Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon, and Schoolcraft. All counties. Do. All except district 18.
17	927 U. S. Courthouse, Kansas City, Mo.	Iowa..... Kansas..... Missouri..... Nebraska.....	Do. All counties. Do. Do.
18	246 U. S. Courthouse Bldg., Chicago, Ill.	Illinois..... Indiana..... Iowa..... Wisconsin.....	Do. Do. Allamakee, Buchanan, Cedar, Clayton, Clinton, Delaware, Des Moines, Dubuque, Fayette, Henry Jackson, Johnson, Jones, Lee, Linn, Louisa, Muscatine, Scott, Washington, and Winneshiek. Columbia, Crawford, Dane, Dodge, Grant, Green, Iowa, Jefferson, Kenosha, Lafayette, Milwaukee, Ozaukee, Racine, Richland, Rock, Sauk, Walworth, Washington, and Waukesha.
19	1025 New Federal Bldg., Detroit, Mich. Suboffice, 541 Old Post Office Bldg., Cleveland, Ohio.	Kentucky..... Michigan..... Ohio..... West Virginia.....	All counties. All except district 16. All counties. Do.
20	518 Federal Bldg., Buffalo, N. Y.	New York..... Pennsylvania.....	All except district 2. All except district 3.
21	Aloha Tower, Honolulu, T. H.	Territory of Hawaii.	
22	P. O. Box 2987 (303 Ochoa Bldg.), San Juan, Puerto Rico.	Puerto Rico. Virgin Islands.	

APPENDIX III

Abbreviations to be used in radio communications—Q code—Abbreviations to be used in all services^{1 2}

Abbreviation	Question	Answer or statement
QRA	What is the name of your station?	The name of my station is . . .
QRB	At what approximate distance are you from my station?	The approximate distance between our stations is . . . nautical miles (<i>or</i> . . . kilometers).
QRC	By what private operating enterprise (<i>or</i> government administration) are the accounts for charges of your station settled?	The accounts for charges of my station are settled by the . . . private operating enterprise (<i>or</i> by the government administration of . . .).
QRD	Where are you going and where do you come from?	I am going to . . . and I come from . . .
QRG	Will you tell me what my exact frequency (wave length) is in kilocycles (<i>or</i> meters)?	Your exact frequency (wave length) is . . . kilocycles (<i>or</i> . . . meters).
QRH	Does my frequency (wave length) vary?	Your frequency (wave length) varies.
QRI	Is the tone of my transmission regular?	The tone of your transmission varies.
QRJ	Are you receiving me badly? Are my signals weak?	I cannot receive you. Your signals are too weak.
QRK	What is the legibility of my signals (<i>1 to 5</i>)?	The legibility of your signals is . . . (<i>1 to 5</i>).
QRL	Are you busy?.....	I am busy (<i>or</i> I am busy with . . .). Please do not interfere.
QRM	Are you being interfered with?.....	I am being interfered with.
QRN	Are you troubled by static?.....	I am troubled by static.
QRO	Must I increase the power?.....	Increase the power.
QRP	Must I decrease the power?.....	Decrease the power.
QRQ	Must I transmit faster?.....	Transmit faster (. . . words per minute).
QRS	Must I transmit more slowly?.....	Transmit more slowly (. . . words per minute).
QRT	Must I stop transmission?.....	Stop transmission.
QRU	Have you anything for me?.....	I have nothing for you.
QRV	Are you ready?.....	I am ready.
QRW	Must I advise . . . that you are calling him on . . . kilocycles (<i>or</i> . . . meters)?	Please advise . . . that I am calling him on . . . kilocycles (<i>or</i> . . . meters).
QRX	Must I wait? When will you call me again?	Wait (<i>or</i> Wait until I have finished communicating with . . .). I shall call you again at . . . o'clock (<i>or</i> immediately).

¹ Abbreviations take the form of questions when they are followed by a question mark.

² The series of signals QA to QD and QF to QN are reserved for the special code of the aeronautical service.

Abbreviations to be used in radio communications—Q code—Abbreviations to be used in all services—Continued

Abbreviation	Question	Answer or statement
QRY	Which is my turn?.....	Your turn is number . . . (or according to any other indication).
QRZ	By whom am I being called?.....	You are being called by . . .
QSA	What is the strength of my signals (1 to 5)?	The strength of your signals is (1 to 5).
QSB	Does the strength of my signals vary?	The strength of your signals varies.
QSD	Is my keying correct; are my signals distinct?	Your keying is incorrect; your signals are bad.
QSG	Must I transmit . . . telegrams (or one telegram) at a time?	Transmit . . . telegrams (or one telegram) at a time.
QSJ	What is the charge to be collected per word to . . . including your internal telegraph charge?	The charge to be collected per word to . . . is . . . francs, including my internal telegraph charge.
QSK	Must I continue the transmission of all my traffic; I can hear you between my signals?	Continue the transmission of all your traffic; I shall interrupt you if necessary.
QSL	Can you acknowledge receipt?.....	I am acknowledging receipt.
QSM	Must I repeat the last telegram which I transmitted to you?	Repeat the last telegram which you transmitted to me.
QSO	Can you communicate with . . . directly (or through . . .)?	I can communicate with . . . directly (or through . . .).
QSP	Will you relay to . . . free of charge?	I will relay to . . . free of charge.
QSR	Has the distress call received from . . . been attended to?	The distress call received from . . . has been attended to by . . .
QSU	Must I transmit (or answer) on . . . kilocycles (or meters) and/or on waves of type A1, A2, A3, or B?	Transmit (or answer) on . . . kilocycles (or . . . meters) and/or waves of type A1, A2, A3, or B.
QSV	Must I transmit a series of V's?.....	Transmit a series of V's.
QSW	Do you wish to transmit on . . . kilocycles (or . . . meters), and/or on waves of type A1, A2, A3, or B?	I am going to transmit (or I shall transmit) on . . . kilocycles (or . . . meters), and/or on waves of type A1, A2, A3, or B.
QSX	Will you listen to . . . (call signal) on . . . kilocycles (or . . . meters)?	I am listening to . . . (call signal) on . . . kilocycles (or . . . meters).
QSY	Must I shift to transmission on . . . kilocycles (or . . . meters), without changing the type of wave? or	Shift to transmission on . . . kilocycles (or . . . meters) without changing the type of wave.

Abbreviations to be used in radio communications—Q code—Abbreviations to be used in all services—Continued

Abbreviation	Question	Answer or statement
	Must I shift to transmission on another wave?	Shift to transmission on another wave.
QSZ	Must I transmit each word or group twice?	Transmit each word or group twice.
QTA	Must I cancel telegram no. . . . as if it had not been transmitted?	Cancel telegram no. . . . as if it had not been transmitted.
QTB	Do you agree with my word count?	I do not agree with your word count; I shall repeat the first letter of each word and the first figure of each number.
QTC	How many telegrams have you to transmit?	I have . . . telegrams for you (or for . . .).
QTE ³	What is my true bearing in relation to you? or	Your true bearing in relation to me is . . . degrees or
	What is my true bearing in relation to . . . (call signal)? or	Your true bearing in relation to . . . (call signal) is . . . degrees at . . . (time) or
	What is the true bearing of . . . (call signal) in relation to . . . (call signal)?	The true bearing of . . . (call signal) in relation to . . . (call signal) is . . . degrees at . . . (time).
QTF	Will you give me the position of my station on the basis of bearings taken by the radio direction-finding stations which you control?	The position of your station on the basis of bearings taken by the radio direction-finding stations which I control is . . . latitude, . . . longitude.
QTG	Will you transmit your call signal during 50 seconds ending with a 10-second dash, on . . . kilocycles (or . . . meters) so that I may take your radio direction-finding bearings?	I will transmit my call signal during 50 seconds, ending with a 10-second dash, on . . . kilocycles (or . . . meters) so that you may take my radio direction-finding bearings.
QTH	What is your position in latitude and in longitude (or according to any other indication)?	My position is . . . latitude, . . . longitude (or according to any other indication).
QTI	What is your true course?.....	My true course is . . . degrees.
Q TJ	What is your speed?.....	My speed is . . . knots (or . . . kilometers) per hour.
QTM	Transmit radio signals and submarine sound signals to enable me to determine my bearing and my distance.	I am transmitting radio signals and submarine sound signals to enable you to determine your bearing and your distance.
QTO	Have you left dock (or port)?.....	I have left dock (or port).

³ In certain aeronautical services, "true course" and "true bearing" are called "geographic course" and "geographic bearing."

Abbreviations to be used in radio communications—Q code—Abbreviations to be used in all services—Continued

Abbreviation	Question	Answer or statement
QTP	Are you going to enter dock (or port)?	I am going to enter dock (or port).
QTQ	Can you communicate with my station by the International Code of Signals?	I am going to communicate with your station by the International Code of Signals.
QTR	What is the exact time?.....	The exact time is . . .
QTU	What are the hours during which your station is open?	My station is open from . . . to . . .
QUA	Have you any news from . . . (call signal of the mobile station)?	This is the news from . . . (call signal of the mobile station).
QUB	Can you give me, in the following order, information concerning: visibility, height of clouds, ground wind at . . . (place of observation)?	This is the information requested:
QUC	What is the last message you received from . . . (call signal of the mobile station)?	The last message I received from . . . (call signal of the mobile station) is . . .
QUD	Have you received the urgent signal transmitted by . . . (call signal of the mobile station)?	I have received the urgent signal transmitted by . . . (call signal of the mobile station) at . . . (time).
QUF	Have you received the distress signal sent by . . . (call signal of the mobile station)?	I have received the distress signal sent by . . . (call signal of the mobile station) at . . . (time).
QUG	Will you be forced to come down on water (or on land)?	I am forced to come down on water (or on land) at . . . (place).
QUH	Will you give me the present barometric pressure at sea level?	The present barometric pressure at sea level is . . . (units).
QUJ ³	Will you please indicate the proper course to steer toward you, with no wind?	The proper course to steer toward me, with no wind, is . . . degrees at . . . (time).
QUK	Can you tell me the condition of the sea observed at . . . (place or coordinates)?	The sea at . . . (place or coordinates) is . . .
QUL	Can you tell me the surge observed at . . . (place or coordinates)?	The surge at . . . (place or coordinates) is . . .
QUM	Is the distress traffic ended?.....	The distress traffic is ended.

³ In certain aeronautical services, "true course" and "true bearing" are called "geographic course" and "geographic bearing."

APPENDIX IV

Miscellaneous abbreviations used in all services

Abbrevia- tion	Meaning
C	Yes.
N	No.
P	Announcing private telegram in the mobile service (to be used as a prefix).
W	Word <i>or</i> words.
AA	All after . . . (to be used after a question mark to request a repetition).
AB	All before . . . (to be used after a question mark to request a repetition).
AL	All that has just been transmitted (to be used after a question mark to request a repetition).
AS	Waiting period.
BN	All between . . . (to be used after a question mark to request a repetition).
BQ	Answer to RQ.
CL	I am closing my station.
CS	Call signal (to be used in requesting that call signal be given or repeated).
DB	I cannot give you a bearing, you are not in the calibrated sector of this station.
DC	The minimum of your signal is suitable for the bearing.
DF	Your bearing at . . . (<i>time</i>) was . . . degrees, in the doubtful sector of this station, with a possible error of two degrees.
DG	Please advise me if you find an error in the bearing given.
DI	Doubtful bearing due to the bad quality of your signal.
DJ	Doubtful bearing due to interference.
DL	Your bearing at . . . (<i>time</i>) was . . . degrees, in the uncertain sector of this station.
DO	Doubtful bearing. Request another bearing later, or at . . . (<i>time</i>).
DP	Beyond 50 miles, possible error of bearing can attain two degrees.
DS	Adjust your transmitter, your minimum signal is too broad.
DT	I cannot give you a bearing, your minimum signal is too broad.
DY	This is a two-way station, what is your approximate direction, in degrees, in relation to this station?
DZ	Your bearing is reciprocal (to be used only by the control station of a group of radio direction-finding stations when addressing other stations of the same group).
ER	Here . . . (to be used before the name of the mobile station in the transmission of routing indications).
GA	Resume transmission (to be used more especially in the fixed service).
JM	If I may transmit, make a series of dashes. To stop my transmission, make a series of dots [not to be used on 500 kc. (600 m.)].
MN	Minute or minutes (to be used to indicate the duration of the waiting period).

Miscellaneous abbreviations used in all services — Continued

Abbrevia- tion	Meaning
NW	I am resuming transmission (to be used more especially in the fixed service).
OK	We agree.
RG	Announcing a request.
SA	Announcing the name of an aircraft station (to be used in transmitting transit data).
SF	Announcing the name of an aeronautical station.
SN	Announcing the name of a coast station.
SS	Announcing the name of a ship station (to be used in transmitting transit data).
TR	To announce sending of indications concerning a mobile station.
TU	Thank you for the cooperation given.
UA	Do we agree?
WA	Word after . . . (to be used after a question mark to request a repetition).
WB	Word before . . . (to be used after a question mark to request a repetition).
XS	Static.
YS	See your service notice.
ABV	Repeat (<i>or</i> I repeat) the figures in abbreviated form.
ADR	Address (to be used after a question mark to request a repetition).
CFM	Confirm (<i>or</i> I confirm).
COL	Collate (<i>or</i> I collate).
ITP	The punctuation counts.
MSG	Announcing a telegram concerning the service on board (to be used as a prefix).
NIL	I have nothing to transmit to you (to be used after an abbreviation of code Q to show that the answer to the question asked is in the negative).
PBL	Preamble (to be used after a question mark to request a repetition).
REF	Reference to . . . (<i>or</i> Refer to . . .).
RPT	Repeat (<i>or</i> I repeat) (to be used in requesting or giving repetition of all or part of the traffic, the abbreviation to be followed by the corresponding indications).
SIG	Signature (to be used after a question mark to request a repetition).
SVC	Announcing a service telegram concerning private traffic (to be used as a prefix).
TFC	Traffic.
TXT	Text (to be used after a question mark to request a repetition).

APPENDIX V

International Morse Code, with extracts from the list of punctuations and other signs contained in the Telegraph Regulations of the Cairo Conferences, 1938.

LETTERS

a .—	i ..	r .—.
b —...	j .— — —	s ...
c —. —.	k .— .—	t —
d —..	l .— ..	u ..—
e .	m — —	v ...—
f ..—.	n —.	w .— — —
g — — —.	o — — —	x —. —.
h	p .— — —.	y —. — — —
	q — — —. —	z — — ..

FIGURES

1 .— — — — —	6 —
2 .. — — —	7 — — ...
3 ... — —	8 — — — ..
4 —	9 — — — — .
5 0 — — — — —	

PUNCTUATION AND OTHER SIGNS

Period .....	.	. —. —. —.
Comma	,	— —. — — —
Colon	:	— — — ...
Question mark, or request for repetition of a transmission not understood	?	. —. — ..
Apostrophe	'	. — — — — .
Dash or hyphen	—	— —
Fraction bar	/	—. —. —.
Parenthesis (before and after words)	()	. —. —. —. —
Underscore (before and after words or part of sentence)	_	. —. —. —
Equal sign	=	— ... —
Understood —.
Error .....		.....
Cross or end-of-telegram or end-of-transmission signal....		. —. —.
Invitation to transmit		—. —
Wait — ...
End of work —. —.
Starting signal (beginning every transmission)		—. —. —.
Separation signal for transmission of fractional numbers (between the ordinary fraction and the whole number to be transmitted) and for groups consisting of figures and letters (between the figure groups and the letter groups) —. —.

The following optional letters and signals may be used exceptionally on connections between countries allowing them:

ä .— .—	ñ — —. — —
á or ã .— —. —	ö — — —.
ch — — — —	ü .. — —
é .. — ..	

In transmitting numbers involving a fraction, the separation signal must, in order to avoid confusion, be transmitted before or after the fraction, as the case may be.

Examples. Instead of $1\frac{1}{16}$, transmit $1 \cdot \text{---} \cdot \text{---} \cdot \text{---} \text{---} \frac{1}{16}$ in order not to have it read $\frac{1}{16}$; instead of $\frac{3}{4} 8$, transmit $\frac{3}{4} \cdot \text{---} \cdot \text{---} \cdot \text{---} \text{---} 8$ in order not to have it read $\frac{3}{48}$; instead of $2\frac{1}{2} 2$, transmit $2 \cdot \text{---} \cdot \text{---} \cdot \text{---} \text{---} \frac{1}{2} \cdot \text{---} \cdot \text{---} \cdot \text{---} \text{---} 2$ in order not to have it read $21/22$.

A group consisting of figures and letters must be transmitted by inserting the separation signal ($\cdot \text{---} \cdot \text{---} \cdot \text{---} \text{---}$) between the figure group and the letter group.

